# THE CAMBRIDGE BRITISH FLORA

VOLUME III TEXT

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# THE CAMBRIDGE BRITISH FLORA

BY

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ASSISTED BY SPECIALISTS IN CERTAIN GENERA

ILLUSTRATED FROM DRAWINGS BY

E. W. HUNNYBUN

VOLUME III

PORTULACACEAE TO FUMARIACEAE

TEXT


Cambridge:
at the University Press
1920

# E. W. HUNNYBUN

It is with great regret that we record the death of Mr E. W. Hunnybun which occurred on July 3, 1918. The publication of the *Cambridge British Flora* would probably not have been undertaken had it not been for the generosity of Mr Hunnybun who presented his collection of drawings to the University.

He began to draw British plants long before the Flora was planned. The delineation of living specimens appealed to his love for plant-form and was a recreation from his occupation as a solicitor peculiarly suited to his temperament: but it must have required a great effort on the part of anyone approaching retirement to undertake the completion of drawings of the whole British Flora, and it was owing to his unfailing industry and interest in the work that the task was completed. While still following his profession he often rose at daybreak and spent two to three hours or more before breakfast collecting or drawing. After he had retired, bad health often made complete rest necessary and obliged him to rely to an increasing extent upon specimens sent to him by correspondents. He not only constantly added new illustrations, but he was ever on the watch to replace or complete some of the earlier drawings. It is fortunate that at the end there remained undrawn only a few rarities which he had been unable to obtain.



An excellent observer, he became increasingly careful to ascertain the diagnostic features of each plant drawn, and where necessary to obtain critical plants or determinations from British authorities. He undoubtedly had a natural genius for accurate line drawing which developed with practice until it became an easy matter for him to transfer the sweeping lines of the living plant directly to paper. The natural result was a singularly accurate picture of each specimen, free from such errors as arise either from mingling the characters of different plants or from adding imagined features to dried specimens. Herbarium material he steadily refused to use: his purpose was the portrayal of actual living individual plants. He had no desire to represent any such intellectual concept as a "species" although in gathering he naturally selected a typical representative after studying a considerable number. This ultimate limitation of the portraiture to a single specimen resulted in a corresponding gain of that permanent truth of observation which was to him the first requirement. Realising that only in this way could absolute accuracy be approached he used to say "I only draw what I see," and the result justified his method. This power of discrimination and accurate observation is shown in the fact that a drawing of a Glasswort made in 1906 was published five years later when *Salicornia disarticulata* was first described as a species new to science. There is no need to add more about his work; it speaks for itself and remains a fitting monument of his quiet industry and care.

A. J. WILMOTT.

*June* 16, 1919.

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101. *Caltha palustris* var. *vulgaris.* Marsh Marigold
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141. *Ranunculus parviflorus.* Small-flowered Crowfoot
142. *Ranunculus arvensis.* Corn Crowfoot
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159. *Ranunculus trichophyllus* var. *rigidus* forma *isophyllus*
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181. *Fumaria capreolata* var. *devoniensis*
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189. *Fumaria officinalis* var. *major*
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# ADDENDA ET CORRIGENDA[1]

## (VOLUME II)

Tournefort's *Institutiones* has, by an oversight, been quoted from the reprint of 1719 instead of from the original edition of 1700.

The first four volumes of De Candolle's *Flore Française* have been quoted as being published in 1815, the date on the substituted title pages. The original title pages bear the date 1805 (see *Journ. Bot.* xxxiv, 431 ((1896)).

Johnson's edition of Gerard's *Herball* has in some cases been cited as published in 1636. The correct date is 1633.

Page xi, line 22. For "*Loranthineae*" read "*Loranthinae*"

Page xv, line 6 from bottom. For "xi" read "xiii"

Page xix, line 1. After "type" insert "if the species is certainly or very probably indigenous"

Page 1, line 23. For "*Viscum*" read "*Lathraea*"

Page 1, line 25. For "Hallier" read "Haller"

Page 6, line 26. After "Sp. Pl." insert "iv"

Page 21, line 7. For "t. 127" read "t. 137"

Page 58, line 19 from bottom. Under *Salix daphnoïdes*, after "Villars" insert "*Prosp.* 51 (1779);"

Page 75, line 7. Under *Quercus sessiliflora*, for "abundant" read "locally abundant"

Page 80, line 17. Under *Betulaceae*, after "stigmas 2" insert "very rarely 3"

Page 87, line 11. Under *Ulnus glutinosa*, after "young." insert "*Flowers* from mid-February to late March"

Page 91, line 10 from bottom. For "westwards" read "eastwards"

Page 112, line 13. Under *Polygonum sagittatum*, after "*for*" insert "*1889*, 267 (1890); also *Rep. for*"

Page 114, line 19. For "Shetland" read "Zetland"

Page 115, line 11. For "*caenosum*" read "*coenosum.*"

Page 115, line 13 from bottom. For "*P.*" read "*Polygonum*"

Page 116, line 10 from bottom. For "*Persicariae*" read "*Lapathifolia*"

Page 120, bottom line. For "Allione" read "Allioni"

Page 121, line 2. For "166 (1855)" read "466 (1845)"

Page 121, line 7 from bottom. After "France" insert "ed. 3,"

Page 122, line 4 from bottom. For "65" read "85"

Page 124, line 27. Under *Polygonum raii*, for "west" read "eastern"

Page 134, line 27. Insert "Forfarshire". In map 23, Forfarshire should be shaded.

Page 136, line 22 from bottom. For "on" read "ou"

Page 137, line 3. Under *Rumex longifolius*, after "From" insert "Derbyshire and". In map 25, Derbyshire should be shaded.

Page 141, line 10. For "microcarpus" read "macrocarpus"

Page 150, line 28. For "*Portulaccales*" read "*Portulacales*"

Page 159, line 9 from bottom. For "on" read "ou"

Page 166, bottom line. For "genus" read "species"; and for "*Beta*" read "*B. maritima*"

Page 175, lines 23 and 24. Delete "*sylvestris annua*"

Page 175, line 24. For "*annuo*" read "*annua*"

Page 175, line 24. Between "*deltoïde*" and "*sinuato*" insert "*triangulari*"

Page 175, line 25. For "*cuspidis*" read "*cuspidi*"

Page 176, line 31. For "mm." read "cm."

Page 177, line 11. For "*macrotheca*" read "*microtheca*"

Page 178, line 5. Under *Atriplex glabriuscula*, for "6—10" read "6—12"

Page 178, line 7. Under *Atriplex glabriuscula*, for "2" read "2—4"

Page 178, line 11. For "Willmott" read "Wilmott"

Page 179, line 6. For "xxvii" read "xxxvii"

Page 179, lines 19 and 20. Under *Atriplex sabulosa*, delete "*Sp. Pl.* ed. 2, 1494 (1763)! quoad descr. et spec.;"

Page 179, lines 30 and 31. For "142, t. 1, fig. 2 (1875)" read "xl, 142, t. 1, fig. 2 (1876)"

Page 179, map 40. In map to *Atriplex sabulosa*, Cardiganshire should be shaded.

Page 181, line 20. Under *Atriplex portulacoïdes*, for "co. Cork" read "Armagh and co. Down southwards to Kerry (? excluding Wicklow), Clare". In map 41, the corresponding counties should be shaded.

Page 183, line 8. Under *Suaeda fruticosa*, after "Moquin" insert "in *Ann. Sc. Nat.* xxiii, 311 (1831);"

Page 186, line 16. For "county" read "maritime county"

Page 188, map 44. In map to *Salicornia perennis* Glamorganshire should not be shaded: the record for that county is an error.

Page 189, line 15. Under *Salicornia perennis*, delete "; Wales—Glamorganshire"

Page 189, line 20 from bottom. Delete "Gloucestershire, and"

Page 205, column 3, line 23. For "Sclerocalyma" read "Sclerocalymma"

## (VOLUMES II AND III)

In these volumes Lamarck's *Flore Françoise* and Decandolle's *Flore Française* have often been cited as "*Fl. France.*"

[1] See also Volume II, page viii.

# INTRODUCTION TO VOLUME III

## *THE CAMBRIDGE BRITISH FLORA*

We need scarcely say that for the delay in the appearance of the present volume III the printers and publishers are in no ways to blame. It is expected that volume IV will appear next, containing the families (Engler's arrangement) *Brassicaceae* (or *Cruciferae*) to *Saxifragaceae* inclusive. Volume V will be devoted to the *Rosaceae*.

### *Specimens for Drawing*

Our thanks are due to the following ladies and gentlemen who kindly sent specimens to Mr Hunnybun for drawing:—

Mr R. S. Adamson, Mr W. B. Barrett, Mr S. H. Bickham, Mr G. Bonner (Keeper of Rochester Castle), Miss L. Burton, Miss R. Cardew, Mr W. G. Clarke, the late Mr W. H. Cook, Mr R. H. Corstorphine, the late Mr H. Cranfield, Mr J. Cryer, the late Mr F. H. Davey, the Rev. F. G. Ellerton, the Rev. E. Ellman, Mr A. H. Evans, Mr G. E. Fulleylove, Mr S. Guiton, the late Mr W. H. Hammond, Mr F. J. Hanbury, Mr W. P. Hiern, the late Mr T. Hilton, Mr E. M. Holmes, Mr A. Hosking, Mr J. H. Howgate, Mr S. Hunt, Miss C. E. Larter, the Rev. E. F. Linton, the late Rev. W. R. Linton, Mr J. E. Little, Mr J. Gordon McDakin, Mr E. D. Marquand, the Rev. E. S. Marshall, Mr W. F. Miller, the late Mr J. Needham, Mr P. O'Kelly, Mr R. Lloyd Praeger, Mr H. W. Pugsley, Miss A. Redmayne, the late Mr Clement Reid, Mr C. E. Salmon, Mr A. S. Shrubbs, Mr A. M. Smith, Mr Magnus Spence, the Rev. S. Streeten, Mr R. F. Towndrow, Mrs L. Vernon, Mr C. C. Vigurs, Mrs M. Wedgwood, Mr J. A. Wheldon, Mr A. Wilson, and, for specimens from botanical gardens, to the Curators of the Royal Botanic Gardens at Edinburgh (Professor I. Bayley Balfour) and of the University Botanic Gardens at Cambridge (Mr R. I. Lynch).

### *Time of Flowering of Species*

In giving the time of the flowering or fruiting of the species in the British Isles, the following plan is adopted. In the case of species which occur in Cambridgeshire or the adjoining counties the time is given when the plants may normally be expected to be in flower or fruit in their localities near Cambridge, no matter how wide the range of such species may be: hence a species which occurs in Cambridgeshire and extends northwards to—say—Caithness-shire, might be in flower or fruit in its northern stations long after the time mentioned in the body of this work. In the case of the more restricted species which do not occur in Cambridgeshire or the adjoining counties, the time of flowering or fruiting given represents the time when the species would be in that condition at their most southern extremity of distribution. Finally in the case of species confined to a single county, the time given represents the time of flowering or fruiting of the species in that county. This plan is adopted to avoid the anomaly of giving a generalised and more or less meaningless flowering or fruiting period in the case of widely distributed species in a country like the United Kingdom of Great Britain and Ireland where there is a very considerable degree of climatic variation.

### *Spelling of the names of British counties*

There is some diversity with regard to the spelling of the names of several British counties. We adopt the spelling used in the official publications and maps of the Ordnance Department, Southampton. This spelling is identical with that given by us in a short article in *The Journal of Botany* for November, 1911 (pp. 338–341).

### *Use of asterisk and dagger*

An asterisk (*) in front of a name of a plant or group of plants signifies that that plant or group of plants is not indigenous in the British Isles. A dagger (†) in front of such name means that the indigenousness of the plant or group of plants is open to some doubt. Plants with no such sign are either indigenous, or are common weeds of cultivation which are taken as indigenous.

### *Distribution maps*

It is impossible to give accurate distributional maps for every species. This is the case, for example, with regard to some critical species whose distribution has not yet been fully worked out, and with regard to species which in some of their stations are indigenous but which in other of their stations are either intentionally planted or are mere strays from cultivation. In addition, maps are not usually given of species which occur, on the one hand, in only one British county, or which, on the other hand, are spread almost throughout the length and breadth of the country. As a rule, maps are not supplied for the non-indigenous species or for mere weeds of cultivation, though exceptions are made when the distribution of such species appears to be known with some degree of precision.

### *Nomenclature*

The subject of the nomenclature of plants is one which seems to arouse the passions of certain botanists. We stated clearly in the Introduction to Volume II our own position. We pointed out (p. xi) that we adopted, in general, the International Rules, and mentioned where we departed from them.

It cannot be said that the very few departures we make from those rules are of a revolutionary nature: on the contrary, our departures from the rules tend to stability of plant-names; and that is why we make them. We venture to add that no botanical work of importance has been published, since the present International Rules were framed, which follows those rules so closely and so rigidly as the *Cambridge British Flora*. What then shall be thought of the intention of a critic, himself rejecting the International Rules in bulk, who glibly suggests that we only follow those rules when it suits our purpose to do so (see Druce in *Bot. Soc. and Exch. Club Brit. Isles Report for 1914*, p. 31, line 11)? Under the circumstances, we take the opportunity of stating that our only purpose in this matter is the stabilisation and standardisation of commonly accepted plant-names.

### *Multinominal, post-Linnaean books*

In the introduction to volume II, we dealt at some length with the matter of those botanical works which, though published at a later date than the *Species Plantarum* (1753), did not adopt the Linnaean or binomial method of naming plants; and we gave our reasons for treating such books as pre-Linnaean, and thus for not accepting any of the names they contain. Although the subject had been discussed by Congress, it was necessary to consider the matter, as some recent botanists, with very doubtful wisdom, had departed from the custom of their predecessors and treated the books in question as if the names (or some of the names) they contained were quite valid. We ourselves suggested that the matter in dispute should be submitted for decision at the International Congress of Botanists, which was due to be held in London in May, 1915. The Congress, of course, was not held; and the matter remains *in statu quo ante*. Pending the decision of the next Congress (whenever it may be held), we shall continue our practice of ignoring all names in the multinomial works in question; and our readers will be glad to know that such a course results in the maintenance of names which have become established in botanical literature and in the rejection of many names which some recent systematists have endeavoured to introduce.

A list of such multinomial, post-Linnaean books is here given: it is probably incomplete as yet; and we shall be glad if botanists would draw our attention to any omissions they may notice, in order that a complete list may be supplied in due course.

Miller *Abridgment of the Gardener's Dictionary* ed. 4 (1754).

Hill *British Herbal* (1756).

Patrick Browne *Civil and Natural History of Jamaica* (1756); ed. 2 (1789) which has Linnaean binomials added to the plates.

Fabricius *Enumeratio Methodica Plantarum Horti Medici Helmstadiensis* (1759); ed. 2 (1763); ed. 3 (1776).

Arduino *Animadversionum botanicarum specimen* (1759).
Miller *Gardener's Dictionary*, ed. 7 (1759).
Hill *Flora Britanica* (1760).
Ludwig *Definitiones Plantarum*, ed. 3, edit Boehmer (1760).
Scopoli *Flora Carniolica* (1760).
Gerard *Flora Gallo-provincialis* (1761).
Adanson *Familles des Plantes* (1763).
Garsault *Description...de...Plantes...suivant l'ordre du...Matère Medicate de M. Geoffroy...* (1764–1767).
Haller *Historia Stirpium indigenarum Helvetiae inchoata* (1768).
J. G. Gmelin *Flora Sibirica* vols. 3 (1768) and 4 (1769), ed. S. G. Gmelin.

### *How species are subdivided into varieties*

A matter which has greatly agitated the mind of Mr James Britten is the method we adopt of subdividing species into varieties. On p. xvii of the Introduction of volume II, we pointed out three ways of doing that, and gave our reasons for adopting the third. Mr Britten would have liked us to have adopted one of the first two, which of them he does not specify. Mr Britten is at liberty to adopt, in his own publications, the plan he deems best; but we cannot refrain from alluding to the fact that in his criticism (*Journ. Bot.* liii, 334–337 (1915)) of the plan which we (following numerous weighty authorities) have seen fit to choose, he was guilty, in his quotations of our remarks, of five textual inaccuracies, some of which made nonsense, and one of which made us say something which we had been very careful not to say. Knowing from experience the uselessness of drawing Mr Britten's attention to his own misquotations, we wrote to Dr Rendle whose name Mr Britten had used. Dr Rendle's reply was remarkable: he stated that he had drawn Mr Britten's attention to the matter, and that one of the misquotations "was intentional," and that, in fact, to have quoted accurately "would have raised another point for explanation the need of which, he [Mr Britten] thought, did not arise." We do not remember to have met before with an attempt so bold (to use no other word) to explain a misquotation admitted to be deliberate and intentional. We are glad to think that we ourselves are not called upon to justify the morality of such a procedure.

### *The initial letter of trivial names*

Mr Britten has also been much perturbed by another matter. He (*Journ. Bot.* li, 21 (1913) and lii, 132 (1914)) has argued against our consistent use of the small initial letter for all trivial names. We need add nothing to our previous statements (*Journ. Bot.* li, (1913) and *Cambr. Brit. Fl.* ii, p. xv (1914)) of the reasons why we adopt this course; but one or two statements on the matter by Mr Britten must be corrected.

Mr Britten asserts that there already exists a "precise rule and custom" on the matter. That can, of course, easily be verified or otherwise by reference to leading floras.

Rouy (*Fl. France*, 14 volumes) uses capital letters when (1) the trivial name is geographical (e.g., *Cirsium Syriacum*), (2) when the trivial name is personal and substantival (e.g., *Jurinea Gouani*), (3) when the trivial name is personal and adjectival (e.g., *Hieracium Hoppeanum*), and (4) when the trivial name is also the name of an old genus (e.g., *Centaurea Jacea*).

Ascherson and Graebner (*Synopsis der Mitteleurop. Fl.*, 7 volumes already completed) use capitals for trivial names in the first three of the above cases but not in the fourth case; for example, they write *Prunus padus* and not (as Rouy would do) *Prunus Padus*.

The International Code recommends[1] the use of capitals in the second, third, and fourth of the above cases, and a small letter in the first.

Ostenfeld and Raunkiaer (*Dansk Ekskursions-Flora*) use capitals only in the second and third of the above cases and small letters in the first and fourth.

F. E. and S. E. Clements (*Rocky Mountain Flowers*) use capitals for trivial names only in the second of the above cases.

Pound and Clements (*Phytogeogr. of Nebraska*) and C. K. Schneider (*Illustr. Handb. der Laubholzkunde*, vol. 1), in common with many zoologists and palaeobotanists, use small letters in all cases, as we ourselves do in the present work.

[1] A recommendation is not a rule (see Introduction to Vol. II, p. xi).

Some old authorities (e.g., Miller *Gardiner's Dictionary*, ed. 8 (1768), and Thuillier *Fl. Env. Paris*, ed. 2 (1799)) use capital letters in all cases.

Druce, of course, introduces a novelty. In his *List of British Plants*, he uses a capital letter when the trivial name ends in "*-ides*." It seems that Druce does that always because Linnaeus did it sometimes. Dr B. Daydon Jackson, in a note in *The Journal of Botany*, attempted to give a list of the cases where such names commemorated old genera; but even when such a name is identical with that of an old genus, how is it to be determined when the name is merely descriptive (cf. *Medicago falcata*) or when it is given in honour of an old genus (cf. *Medicago Falcata*)?

It should be added that no author is absolutely consistent in the matter. Linnaeus sometimes uses *Salix Caprea* and sometimes *Salix caprea*. Who will say which is correct?

It is obvious, therefore, that Mr Britten's idea of precision in rules and customs is highly original.

C. E. MOSS.

Botany School, Cambridge.
*January 27th*, 1917.

The Syndics of the University Press wish to thank Mr A. J. Wilmott of the Botanical Department of the British Museum for much valuable assistance given by him both in correcting proofs and in dealing with questions which are normally settled by an Editor, in the absence from England of Professor Moss.

## Order 3. PORTULACALES

**Portulacales** nobis; *Portulacineae* Engler *Syll.* ed. 2, 113 (1898); Carter *Gen. Brit. Plants* 42 (1913).

*Leaves* stipulate or not, alternate or opposite. *Flowers* bracteate or ebracteate. *Perianth* heterochlamydeous. *Calyx* consisting of 2 (rarely 4—8), median, nearly opposite sepals[1]. *Corolla* with 3—6, usually 5 petals, polypetalous or gamopetalous. *Stamens* 1—∞; if 5, antipetalous. *Carpels* 2—8. *Fruit* a pyxidium, or capsule, or berry. *Placentation* basal. *Endosperm* present.

See also Volume II, page 150. Only British family:—*Portulacaceae.*

### Family 1. PORTULACACEAE

**Portulacaceae** Lindley *Nat. Arr.* ed. 2, 123 (1836); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 51 (1889); *Portulaceae* Jussieu *Gen. Pl.* 312 (1789) partim; Rouy et Foucaud *Fl. France* iii, 314 (1896).

Herbs, usually glabrous. *Leaves* usually alternate, occasionally opposite or subopposite, exstipulate or stipulate, usually entire and more or less succulent. *Inflorescence* usually cymose, terminal or axillary, rarely solitary. *Flowers* monoclinous, usually opening only in bright sunshine, usually entomophilous, sometimes self-pollinated or even cleistogamous. *Sepals* usually 2, rather large, the lower one overlapping the upper one. *Petals* usually 5, separate or more or less coherent. *Stamens* all fertile, usually attached to the base of the petals and opposite to them. *Anthers* versatile, introrse, dehiscing longitudinally. *Ovary* usually superior (subinferior in *Portulaca*), with 1 loculus. *Style* united below. *Stigmas* 3—8. *Seeds* 1—∞, each on a basal funicle, funicles often connate. *Embryo* usually peripheral. *Endosperm* starchy. *Radicle* long.

About 17 or 18 genera and 210 species; cosmopolitan but chiefly American.

#### British genera of *Portulacaceae*

Genus 1. ***Claytonia** (see below). *Sepals* persistent. *Corolla* actinomorphic, polypetalous. *Stamens* 5. *Ovary* superior.

Genus 2. **Montia** (p. 3). *Sepals* persistent. *Corolla* zygomorphic, gamopetalous. *Stamens* usually 3. *Ovary* superior.

Genus 3. †**Portulaca** (p. 6). *Sepals* caducous above. *Corolla* actinomorphic, polypetalous. *Stamens* 4—∞. *Ovary* subinferior.

### Genus 1. *Claytonia

**Claytonia** [Gronovius *Fl. Virg.* 25 (1743);] L. *Sp. Pl.* 204 (1753) et *Gen. Pl.* ed. 5, 96 (1754); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 57 (1889); *Limnia* [L. in *Kongl. Sw. Wet. Acad. Handl.* (Stockholm) vii, 130, t. 5 (1746);] Haworth *Syn. Pl. Succ.* 11 (1812) incl. *Claytonia.*

Perennial or annual herbs. *Shoot* usually glabrous and more or less succulent. *Leaves* exstipulate; ground-leaves with long petioles; stem-leaves alternate or opposite, with petioles short or absent. *Inflorescence* usually terminal. *Flowers* actinomorphic, protandrous. *Sepals* 2, ovate, persistent. *Petals* 5, free. *Stamens* 5, antipetalous, joined to the petals at the base. *Ovary* superior. *Ovules* few. *Fruit* a capsule, explosive, 3-valved, globose. *Seeds* usually 3, compressed. *Embryo* peripheral.

The genus was named after John Clayton, a botanist of Virginia, and a correspondent of Gronovius.

About 20 species; northern Asia; northern and central America; Australia, New Zealand.

[1] Probably these structures are really bracteoles; and if so the perianth should be regarded as monochlamydeous and the so-called petals as sepals.

British species of *Claytonia*

1. ***C. alsinoïdes** (see below). *Laminae* of the stem-leaves suborbicular. *Corolla* pink or pale pink, at least twice as large as that of *C. perfoliata*. *Fruit* about half as long as the calyx.

2. ***C. perfoliata** (see below). *Laminae* of the stem-leaves connate and perfoliate. *Corolla* white, small. *Fruit* about as long as the calyx.

## 1. *CLAYTONIA ALSINOÏDES. Plate 1

**Claytonia alsinoïdes** Sims in *Bot. Mag.* no. 1309 (1810); Baxter *Brit. Bot.* iv, 253 (1839); *Limnia alsinoides* Haworth *Syn. Pl. Succul.* 12 (1812); *C. sibirica* N. E. Brown in *Eng. Bot.* ed. 3, suppl., 50 (1891) non L.

Icones:—*Bot. Mag.* t. 1309; t. 2243, as *C. sibirica*; Baxter *op. cit.* t. 253; N. E. Brown in *Eng. Bot.* ed. 3, suppl., t. 260a, as *C. sibirica*.

*Camb. Brit. Fl.* iii. *Plate 1.* (*a*) Plant in flower. (*b*) Petal. (*c*) Flower. (*d*) Pistil (enlarged). (*e*) Fruit with persistent sepals (one enlarged). (*f*) Fruit (enlarged). Hort., Devonshire (E. W. H.).

Exsiccata:—Funston (Yakutat Bay, Alaska), 42, as *C. sibirica*.

Annual. *Shoot* rather succulent, about 2—3 dm. high. *Ground-leaves* with petioles about 2—4 times as long as the laminae. *Stem-leaves* sessile, about 3—4 cm. long and 2—3 broad. *Bracts* small, oval to linear. *Flowers* 1·2—2·0 cm. in diameter; April to July. *Pedicels* slender, about 2·5 cm. long at maturity, about four times as long as the sepals. *Sepals* broadly oval, persistent, enlarging a little in fruit. *Petals* pink or pale pink, oblong, emarginate or bifid, 2—3 times as long as the sepals. *Stigmas* 3, nearly as long as the style. *Capsule* about half as long as the calyx. *Seeds* 1—3, dark brown, punctulate.

The plant named *C. sibirica* in the Linnaean herbarium has much broader leaves than any plant we have seen naturalised in Great Britain, and belongs, we believe, to a different species.

Writing of the naturalisation of the plant in a Renfrewshire station, Mr J. R. Lee (*in litt.*) states:—"The wood in which the plant grows is of the 'mixed' type, with a good deal of self-sown birch [*Betula*] and rowan [*Pyrus aucuparia*]; and so profuse is the growth of the *Claytonia* that it far outnumbers the other ordinary herbs of the plant-carpet which it appears to be ousting at this place."

Naturalised in woods and plantations, chiefly on siliceous soils in northern England and central Scotland; Flintshire, Herefordshire, Derbyshire, Cheshire, West Riding of Yorkshire, Lancashire, Cumberland, Northumberland, Ayrshire, Renfrewshire, Forfarshire, Perthshire, Orkney, and perhaps elsewhere; no record for Ireland.

Western North America (e.g., Oregon, Vancouver, Columbia, Alaska).

## 2. *CLAYTONIA PERFOLIATA. Plate 2

**Claytonia perfoliata** [Don *Hort. Cantab.* 25 (1796) nomen;] Willdenow *Sp. Pl.* i, 1186 (1798); Hussey in *Phytol.* i, ser. 2, 389 (1856); Syme *Eng. Bot.* ii, 137 (1864); *Montia perfoliata* Howell in *Erythaea* i, 38 (1893); Robinson and Fernald in Gray's *New Man.* ed. 7, 388 (1908).

Icones:—*Bot. Mag.* t. 1336; Syme *Eng. Bot.* ii, t. 260.

*Camb. Brit. Fl.* iii. *Plate 2.* (*a*) Plant in flower. (*b*) Petals with stamens attached (enlarged). (*c*) Flower (enlarged). (*d*) Pistil (enlarged). (*e, f*) Capsules, one exploded (enlarged). Surrey (A. R.).

Exsiccata:—Abrams, 3296, as *Montia perfoliata*.

Annual. *Shoot* succulent about 2—3 dm. high. *Ground-leaves* forming a rosette, with petioles about 4—6 times as long as the laminae; laminae broadly rhomboidal. *Stem-leaves* connate and perfoliate, the two about 4 cm. long and 3·5 broad. *Inflorescence* with 1—3 basal flowers, and many flowers above. *Bracts* ovate, about twice as long as the sepals. *Flowers* about 6—8 mm. in diameter; April to June. *Petals* white, oval, entire or emarginate, a little longer than the sepals. *Stigmas* 3, nearly as long as the style. *Capsule* subglobose about as long as the calyx. *Seeds* 1—3, lenticular, shining, black, punctulate.

On the light sandy soils of the "breck" country in western Suffolk, this plant now is locally very abundant, frequently growing under the planted pine trees along the road-sides.

Naturalised, chiefly on light sandy or gravelly soils; Cornwall, Dorset, Hampshire, Sussex, Surrey, Kent, Essex, Suffolk, Norfolk, Cambridgeshire, Berkshire, Oxfordshire, Herefordshire, Lancashire, and perhaps elsewhere; ? Scotland; no record for Wales or Ireland.

Western North America (e.g., California). Naturalised in Denmark, Germany, and Belgium.

## Genus 2. Montia

By G. CLARIDGE DRUCE, M.A.

**Montia** [Micheli *Nov. Pl. Gen.* 17, t. 13, fig. 2 (1729); Haller *Stirp. Helv.* i, 608 (1742);] L. *Sp. Pl.* 87 (1753) et *Gen. Pl.* ed. 5, 38 (1754); Bentham and Hooker *Gen. Pl.* i, 159 (1862); Pax in Engler und Prantl *Pflanzenfam.* iii, pt i b, 55 et 58 (1889); *Cameraria* [Dillenius *App. Cat. Giss.* 114, t. 6 (1719);] Moench *Meth. Pl.* 520 (1794) [non Plumier *l. c.*].

Annual, rarely biennial or perennial herbs. *Leaves* opposite, rather succulent. *Inflorescence* few-flowered or solitary. *Flowers* very small, somewhat zygomorphic, often self-pollinated or even (in the submerged forms) cleistogamous. *Sepals* 2, rarely 3, ovate to suborbicular, persistent, larger than the petals. *Corolla* small, white, more or less gamopetalous but split posteriorly, with 5 petals, inserted at the base of the calyx; petals united below, the 2 outer ones larger than the 3 inner ones, the median one the smallest. *Stamens* inserted at the top of the corolla-tube, 3 and opposite the smaller petals, or rarely 5 and antipetalous. *Ovary* superior, unilocular; ovules 1—3, basal. *Style* short. *Stigmas* 3, linear. *Capsule* explosive, opening by 3 valves, subglobose, surrounded by the persistent perianth. *Seeds* 1—3, suborbicular, compressed, reticulate or tuberculate. *Embryo* peripheral.

As distinct from the old *Portulaca* and *Alsine*, the present genus was founded by Dillenius (*op. cit.*) in 1719. Dillenius had used for it the name *Cameraria* in 1717, but on this occasion did not furnish any generic description. It was named *Cameraria* in honour of Joachim Camerarius, the great Nürnberg botanist who flourished during the latter part of the sixteenth century, and who had previously diagnosed the species in his *Hort. Med.* 131 (1588) as *Portulaca exigua sive andrachnion arvense*. However, the name *Cameraria* had already by Plumier (*Gen.* 18 t. 29, f. 1 (1703)) been bestowed on an Apocynaceous genus. Moench (*loc. cit.*) in 1794 unsuccessfully attempted to revive the name *Cameraria* for the valid one of *Montia*.

The name *Montia* was first used by Micheli (*loc. cit.*) in 1729, who thus commemorated his countryman Giuseppe Monti (1682—1760), a professor of botany at Bologna.

1 species (sometimes subdivided into 2 or 3); Europe (including the Faeröes and Iceland); northern Africa; northern, central, and south-western Asia; North America; South America—the Andes and the Falkland Islands; Australia and New Zealand.

### 1. MONTIA FONTANA. Blinks. Plates 3, 4

*Portulaca exigua sive andrachnion arvense* Camerarius *Hort. Med.* 131 (1588); *Alsine aquatica surrectior* Ray *Cat. Cantab. App.* i, 3 (1663) [=var. *chondrosperma*]; *A. flosculis conniventibus* Merrett *Pinax* 5 (1666); *Portulaca minima alba* Morison *Prael. Bot.* 165 (1669) [=var. *chondrosperma*]; *Alsine parva palustris tricoccus portulacae aquaticae similis* Ray *Syn.* 149 (1690); cf. Dillenius in ed. 3, 352 (1724) [=var. *chondrosperma*]; *Cameraria arvensis* Dillenius in *Acad. Caesar.-Leopold. Carol. Natur. Curios. Ephem.* cent. 5 et 6, app. p. 88, t. x, fig. 31 (1717) incl. *C. aquatica* fig. 32; *C. arvensis et minor* Dillenius *Cat. Giss.* 46 (1719) [=var. *chondrosperma*]; *M. aquatica minor* Micheli *Nov. Pl. Gen.* 18, t. 13, fig. 2 (1729) [=var. *chondrosperma*].

**Montia fontana** L. *Sp. Pl.* 87 (1753)!; Syme *Eng. Bot.* ii, 136 (1864).

Annual, rarely (in the water-forms) biennial or even perennial. *Root* fibrous. *Stem* erect, or ascending, or decumbent and creeping at the base, or prostrate, or almost submerged under water. *Leaves* with short dilated petioles, somewhat connate, elliptical, spathulate, entire, pale yellowish-green to dark green in colour. *Inflorescence* 1—7 flowered, cymes axillary or axillary and terminal. *Pedicels* bent at first, straightening later. *Flowers* 2—4 mm. long; April to August. *Seeds* either tubercled and dull or reticulate with 2—3 rows of flattened tubercles toward the keel, or without prominent tubercles and finely reticulate and shining; black to pale chestnut-brown in colour.

Continental botanists differ as to the number of species into which the aggregate *M. fontana* should be divided. Ascherson und Graebner (*Fl. Nordostd. Flachl.* 293 (1898) have three species, grouped, however, under the "Gesammtart *M. fontana*": Pax in Engler und Prantl *Pflanzenfam.* iii, 1 b, 58 (1889) has two species; and Engler und Gilg (*Syll.* ed. 7, 183 (1912)) have only one.

Whilst the synonyms cited by Linnaeus prove that he included both var. *lamprosperma* and var. *chondrosperma* in his *Montia fontana*, yet it is clear to me that the plant he actually had in mind was the former variety, since this is the plant of his herbarium, and indeed the only one that occurs in Scandinavia.

I adopt Fenzl's varietal names because they are the earliest that are based on the character of the seed; and earlier varietal names[1] are consequently indeterminable. In my opinion, the name *M. fontana* L. (*loc. cit.*) should, if the plant is divided into two or more species be restricted to the northern plant (=var. *lamprosperma*). In point of priority, Necker's name *M. verna* antedates Gmelin's *M. minor*; and it is quite clear that Necker's plant is the one afterwards named *M. fontana* var. *chondrosperma* by Fenzl (*loc. cit.*); and therefore, if the aggregate *M. fontana* is subdivided into small species, the correct name of the southern plant would be *M. verna* and not *M. minor*.

[1] e.g., Persoon *Syn.* i, 111 (1805) has var. *erecta* and var. *repens*.

(*a*) **M. fontana** var. **lamprosperma** Fenzl in Ledebour *Fl. Ross.* ii, pt. i, 152 (1844); *M. fontana* L. *Sp. Pl.* 87 (1753)! in sensu stricto, excl. syn. Micheli, Dillenius, Plukenet, Vaillant, Petiver, et Bauhin; Druce in *Rep. Bot. Exch. Club Brit. for 1908* ii, 330 (1909); *M. rivularis* Gmelin *Fl. Bad.* i, 302 (1805) partim; Ostenfeld in Warming *Bot. Faeröes* i, 73 (1901); *M. lamprosperma* Chamisso in *Linnaea* vi, 564 (1831); Hallier und Wohlfarth in Koch's *Syn.* 896 (1892); Druce in *Ann. Scot. Nat. Hist.* 121 (1909); *M. fontana* var. *rivularis* Syme *Eng. Bot.* ii, 136 (1864) partim; *M. minor* var. *lamprosperma* Rouy et Foucaud *Fl. France* iii, 316 (1896), incl. subsp. *rivularis* part.; *M. fontana* subsp. *lamprosperma* Lindberg in *Med. Soc. Fauna et Flora Fenn.* 21 (1901); Beeby in *Ann. Scot. Nat. Hist.* 105 (1909).

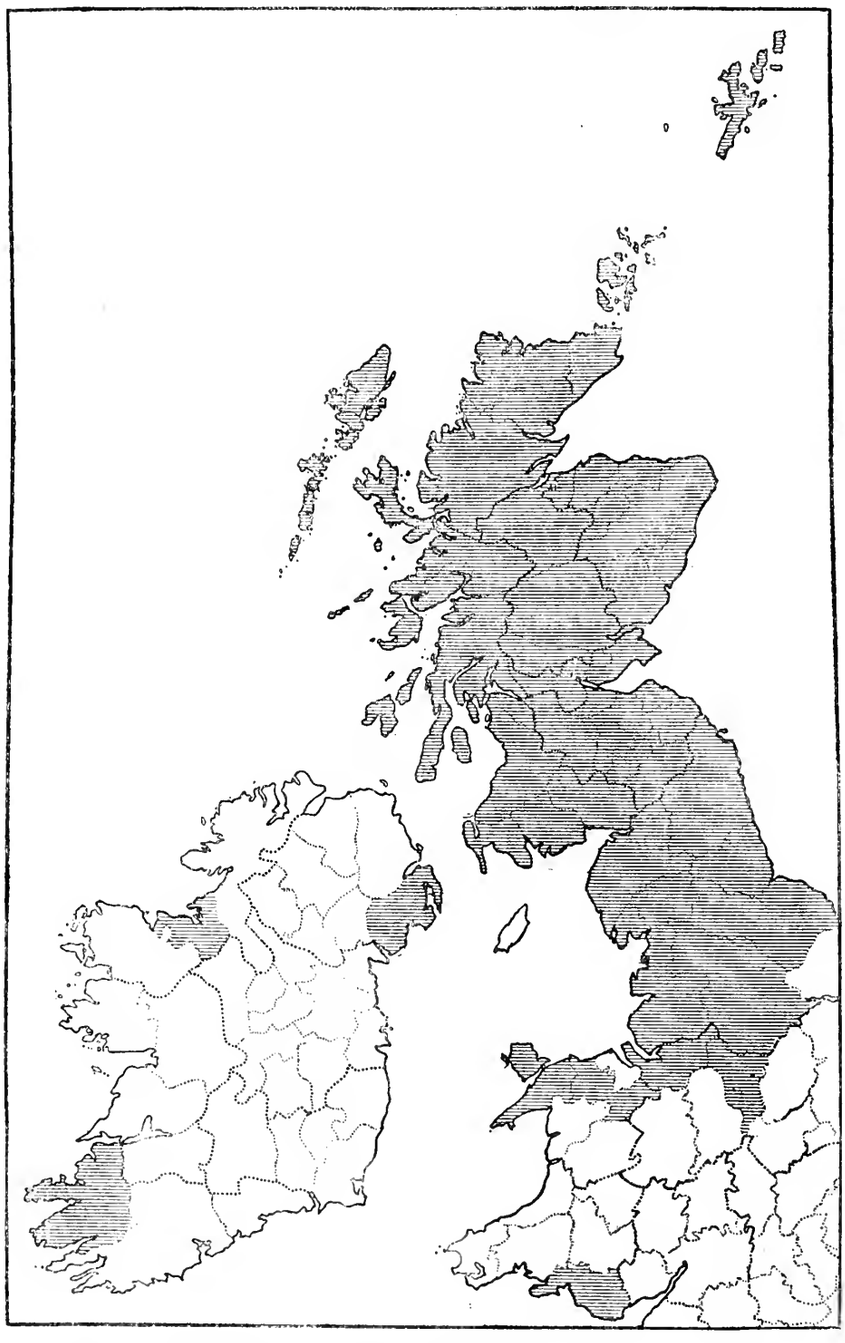
Icones:—*Fl. Dan.* t. 131, as *M. fontana*; t. 1926, as *M. fontana* var. *major*.

*Camb. Brit. Fl.* iii. *Plate 3.* (*a*) Flowering shoots. (*b*) Seeds (much enlarged). Perthshire (G. C. D.).

Exsiccata:—*Herb. Fl. Ingric.* ii, 239, as *M. fontana.*

Annual. *Seeds* reticulate or finely granular on the edges, light brown to blackish brown in colour, shining.

Seeds of this variety have been sent to me by Mr Clement Reid from the interglacial beds at Redhall, near Edinburgh.



Map 1. Distribution of *M. fontana* var. *lamprosperma* in the British Isles

(*β*) var. **lamprosperma** forma **boreo-rivularis** Druce in Moss *Camb. Brit. Fl.* iii, 4; *M. fontana* var. *major* Wallroth in *Linnaea* xiv, 546 (1840) non Schrader; *M. fontana* var. *rivularis* Syme *Eng. Bot.* ii, 136 (1864) partim; *M. fontana* subsp. *lamprosperma* var. *boreo-rivularis* Lindberg in *Med. Soc. Fauna et Fl. Fenn.* 21 (1901).

Exsiccata:—Dörfler, 5060, as *M. lamprosperma* var. *boreo-rivularis*; Fellman, 100, 1863, as *M. fontana*; Fries, xiv, 58, as *M. fontana* var. *rivularis*; *Fl. Exsicc. Austro-Hung.*, 2050, as *M. rivularis.*

Biennial or perennial, almost submerged under water, upper part of shoot only emerging and usually of a darker green than the land form. *Inflorescence* axillary. *Flowers* often cleistogamous. *Capsule* smaller. *Seeds* usually larger, finely reticulate, shining, usually paler brown in colour.

This is simply the water-form of var. *lamprosperma*; it occurs in the well-aërated waters of springs, rills, or shallow pools on acidic soils in the hilly and northern parts of the British Isles; locally common. It ascends to 820 m. in Austria.

*M. fontana* var. *lamprosperma* occurs from Glamorganshire and Derbyshire northwards to Zetland; Ireland—counties Galway, Sligo, and Down; from near sea-level in Kirkcudbrightshire to 1036 m. in Aberdeenshire.

Faeröes and Iceland (the only form), Scandinavia (the only form), and Denmark (the prevailing form), northern Germany, France, central Europe (up to 2200 m.), Russia; Arctic America, the Andes, and Greenland.

(*b*) **M. fontana** var. **intermedia** Druce in Moss *Camb. Brit. Fl.* iii, 5; *M. fontana* subsp. *minor* var. *intermedia* Beeby in *Ann. Scot. Nat. Hist.* 104 (1909).

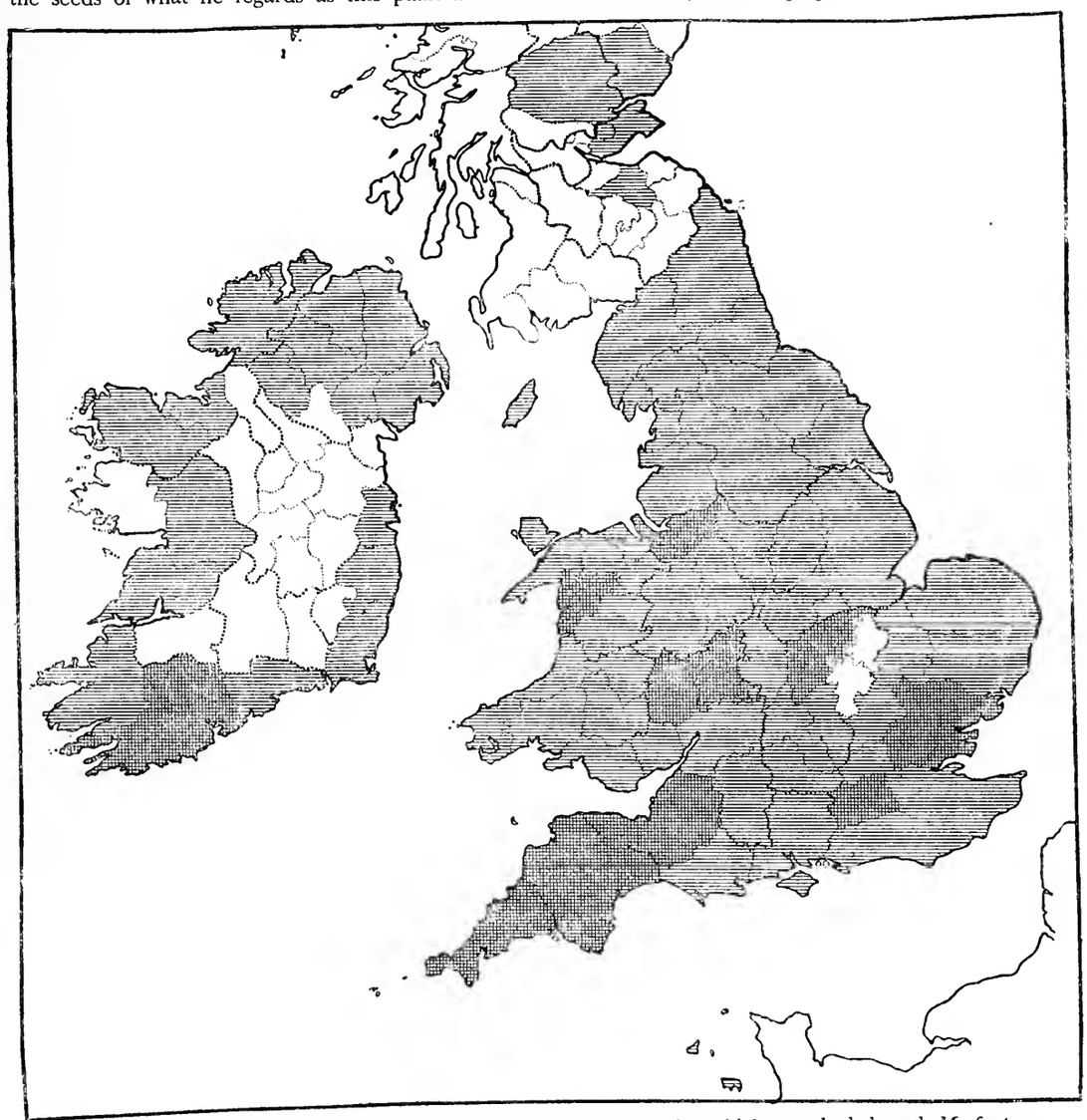
Icones:—Chamisso in *Linnaea* v, t. 7, fig. 2 (1831), as *M. lamprosperma.*

Exsiccata:—Van Heurck, iii, 61, as *M. rivularis*; Huter (*Itin. Hisp.*, ann. 1879), 794, as *M. rivularis*; Reverchon, 965, as *M. minor*; *Pl. Gall. Sept. et Belg.*, 279, as *M. rivularis.*

*Seeds* covered with rather coarser reticulations than in var. *lamprosperma*, and with two or three rows of smaller and less prominent tubercles on each side of the keel which is itself granular-tuberculate; usually of a darker colour than var. *lamprosperma.*

Although this variety is intermediate in its seed-character between var. *lamprosperma* and var. *chondrosperma*, its distribution precludes its being regarded as a hybrid.

Babington (*Man.* ed. 2, 119 (1847)) no doubt had this form in mind when he referred to "*M. minor* Gmelin," as he states that the seeds of what he regards as this plant are "reticulate-scabrous, rather opaque."



Map 2. *M. fontana* var. *chondrosperma* occurs in all the counties which are shaded, and *M. fontana* var. *intermedia* in those which are shaded darkly

*M. fontana* var. *intermedia* is local, usually occurring in watery places, the land-form apparently being rather rare. Cornwall, Devonshire, Somerset, Surrey, Essex, Northamptonshire, Worcestershire, Cheshire; Wales—Merionethshire; Ireland—co. Cork.

Belgium and Spain, and doubtless elsewhere.

(*c*) **M. fontana** var. **chondrosperma** Fenzl in Ledebour *Fl. Ross.* ii, part 1, 152 (1844); *M. fontana* L. *loc. cit.*, partim, non herb.; Gaertner *Fruct.* ii, 220, t. 129 (1791); Smith *Fl. Brit.* i, 161 (1800)!; *Eng. Bot.* no. 1206 (1803); Chamisso in *Linnaea* vi, 565, t. 7, fig. 1 (1831); sensu stricto; *M. verna* Necker *Delic. Fl. Gallo-Belg.* i, 78 (1773); *M. minor* Gmelin *Fl. Baden.* i, 301 (1805) partim; Hallier und Wohlfarth in Koch's *Syn.* 896 (1892); *M. arvensis* Wallroth in *Linnaea* xiv, 547 (1840); *M. minor* var. *chondrosperma* Rouy et Foucaud *Fl. France* iii, 316 (1896); *M. fontana* subsp. *minor* var. *chondrosperma* Beeby in *Ann. Scott. Nat. Hist.* 104 (1909).

Icones:—Smith *Eng. Bot.* t. 1206, as *M. fontana*; Graves and Hooker in Curtis's *Fl. Lond.* ed. 2, as *M. fontana*· Gaertner *Fruct.* ii, t. 129, as *M. fontana*; Baxter *Phaen. Bot.* iii, t. 196, as *M. fontana.*

*Camb. Brit. Fl.* iii. *Plate 4.* (*a*) Whole plants. (*b*) Seeds (enlarged). Devonshire (G. C. D.). (*c*) Fertile shoot. (*d*) Flower (enlarged). (*e*) Seed (enlarged). Derbyshire (C. E. M.). (*f*, *g*) Whole plants of the terrestrial form. (*h*) Leaf (enlarged). (*i*) Seeds (enlarged). Cornwall.

Exsiccata :—Billot, 131, as *M. minor*; Dörfler, 4723, as *M. minor*; van Heurck, i, 20, as *M. minor*; Todaro, 656 (partim), as *M. minor*; Welwitsch (*Fl. Lusit.*), 1050, as *M. fontana*; Fiori, Béguinot, et Pampanini (*Fl. Ital. Exsicc.*), 788, as *M. minor*.

Differs from var. *lamprosperma* by its seeds being not merely reticulate but covered with coarse and often prominent tubercles; seeds also usually dull and black.

Seeds have been found by Mr Clement Reid in Roman Silchester, and in the interglacial beds at Redhall, near Edinburgh.

(*β*) var. **chondrosperma** forma **major** Druce in Moss *Camb. Brit. Fl.* iii, 6 (1913); *M. fontana* var. *major* Schrader *Fl. Germ.* 415 (1806); S. F. Gray *Nat. Arr.* ii, 544 (1821); Koch *Syn.* 253 (1837); Wallroth in *Linnaea* xiv, 546 (1840); *M. rivularis* Gmelin *Fl. Baden.* i, 302 (1805) partim; Hallier und Wohlfarth in Koch *Syn.* 896 (1892); *M. fontana* var. *rivularis* Boenninghausen *Prodr. Fl. Monast.* 12 (1824); Syme *Eng. Bot.* ii, 136 (1864); partim; *M. minor* subsp. *rivularis* Rouy et Foucaud *Fl. France* iii, 316 (1896).

Exsiccata :—Todaro, 656 (partim), as *M. minor*; Fiori, Béguinot, et Pampanini (*Fl. Ital.*), 789, as *M. rivularis*.

This, the water-form of var. *chondrosperma* resembles var. *lamprosperma* in its vegetative characters; but it has the tubercled seeds of var. *chondrosperma*, albeit these are sometimes less dark in colour and not uncommonly somewhat larger in size.

*M. fontana* var. *chondrosperma* occurs in similar situations as var. *lamprosperma*; throughout England and Wales (not yet recorded for Bedfordshire and Huntingdonshire); Scotland—Edinburghshire, Fifeshire, Forfarshire, Perthshire; Ireland; usually lowland, but it ascends to 390 m. on Dartmoor, in Devonshire.

Denmark, Germany, Belgium, France, central and southern Europe.

*M. fontana* occurs in wet or damp places, or near springs, on the margins of rills and rivulets, on the edges of pools, on wet rock-ledges, on peaty ground sometimes inundated, on moors and heaths, in damp woods, on sandy or shingly paths and road-sides, and as a weed of cultivated land; shunning calcareous rocks, basic clays, and fen peat; from sea-level up to about 1036 m. (as var. *lamprosperma*) in Aberdeenshire; the water-forms prefer well-aërated water.

Foreign distribution, as for the genus (see page 3).

## Genus 3. †Portulaca

**Portulaca** [Tournefort *Inst.* 236, t. 118 (1700);] L. *Sp. Pl.* 445 (1753) et *Gen. Pl.* ed. 5, 204 (1754); Haworth *Syn. Plant. Succul.* 121 (1812); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 59 (1889); Rouy et Foucaud *Fl. France* iii, 315 (1896).

Herbs. *Shoot* diffuse or ascending, more or less succulent. *Leaves* alternate or nearly opposite, with scarious, sometimes minute stipules. *Sepals* 2, united at the base, the upper free parts caducous. *Petals* 4—6, free or slightly united below, inserted at the top of the calyx-tube (or receptacle). *Stamens* 4—∞ perigynous, free or adherent to the base of petals. *Ovary* subinferior. *Stigmas* 3—8. *Fruit* many-seeded, dehiscing transversely. *Seeds* ∞, compressed. *Embryo* peripheral.

About 38 species; tropical and warm temperate zones. Only British species :—†*P. oleracea.*

### 1. †PORTULACA OLERACEA. Plate 5

**Portulaca oleracea** L. *Sp. Pl.* 445 (1753)!; Haworth *Misc. Nat.* 136 (1803); Rouy et Foucaud *Fl. France* iii, 315 (1896).

Icones :—Sibthorp et Smith *Fl. Graec.* t. 457.

*Camb. Brit. Fl.* iii. *Plate 5.* Portion of flowering shoot. Jersey (E. W. H.).

Exsiccata :—Billot, 3859; Watson (*Pl. Azor.*), 89; Wirtgen (*Herb. Flor. Rhen.*) 1025.

Annual. *Shoot* succulent, often reddish, glabrous, 1—3 dm., prostrate, much branched. *Petioles* short or absent. *Laminae* opposite at least below, entire, crowded at the ends of the branches. *Inflorescence* solitary or few-flowered. *Flowers* sessile, about 5 mm. in diameter, opening only on warm mornings; June to September. *Bracts* rather unequal in size. *Corolla* yellow. *Stamens* sensitive. *Fruit* ovoid-trigonous. *Seeds* black, shining, finely tubercled.

A weed of cultivated land; locally abundant in the Channel Isles, and near London, as at Kew and Richmond.

France (including Brittany), and central and southern Europe; warm-temperate and hot regions throughout the world.

## Order 4. DIANTHALES

**Dianthales** Williams [*Prov. and Tent. List.* 6 (1895) excl. *Portulacaceae*, nomen;] *Prodr. Fl. Brit.* i, p. xv (1911) excl. *Portulacaceae*; *Caryophyllineae* Spach *Hist. Nat. Vég. Phanérog.* v, 143 (1836); Engler *Syll.* ed. 2, 114 (1898); Carter *Gen. Brit. Plants* 43 (1913).

*Leaves* usually exstipulate, usually opposite and decussate. *Flowers* usually bracteate. *Perianth* usually heterochlamydeous. *Calyx* of 4 or 5 sepals. *Corolla* polypetalous, of 4 or 5 petals, rarely absent. *Stamens* 3—10, outer whorl usually antisepalous. *Carpels* 1—5. *Fruit* usually a capsule. *Placentation* basal or free-marginal ("free-central"). *Endosperm* present.

See also Volume II, page 150.

### Families of *Dianthales*

Family 1. **Illecebraceae** (see below). *Leaves* usually stipulate (exstipulate in *Scleranthus*), opposite or alternate. *Petals* usually represented by subulate staminodes (absent in *Scleranthus*, ligulate and petaloid in *Corrigiola*). *Stigmas* 3—2. *Fruit* usually indehiscent; when dehiscent, splitting transversely or irregularly. *Seeds* usually 1, rarely 2, to each fruit. *Placentation* basal.

Family 2. **Dianthaceae** (or *Caryophyllaceae*) (p. 13). *Leaves* usually exstipulate (stipulate in *Polycarpon*, *Spergula*, and *Spergularia*), opposite. *Petals* not subulate (absent rarely in certain species and varieties of *Cerastium*, *Stellaria*, *Lychnis*, etc.). *Stigmas* 5—2. *Fruit* dehiscent, splitting longitudinally. *Seeds* several in each fruit. *Placentation* free-marginal (or "free-central").

## Family 1. ILLECEBRACEAE

**Illecebraceae** Lindley *Nat. Arr.* ed. 2, 127 (1836) emend.; Bentham and Hooker *Gen. Pl.* iii, 12 (1880); Robinson and Fernald in Gray's *New Man.* ed. 7, 376 (1908); Rouy *Fl. France* xii, i (1910).

Perennial or annual herbs, rarely shrubby. *Leaves* alternate or opposite, entire or serrulate, stipulate or exstipulate. *Calyx* small; segments 4—5, joined or free, persistent. *Staminodes* or *petals* either absent (as in *Scleranthus*), or setaceous (usually), or (as in *Corrigiola*) white and ligulate; borne, like the stamens, on the disc or (as in *Scleranthus*) on the calyx. *Ovules* 1—4, usually 1. *Stigmas* 2—3. *Placentation* basal. *Fruit* indehiscent or rarely dehiscent, when dehiscent splitting transversely or irregularly, 1-locular, usually 1-seeded. *Seed* basal or suspended from a basal funicle. *Embryo* curved or nearly straight.

*Scleranthus* is very distinct from the other genera, and probably ought to be taken out of the family or even the order.

By some authorities, the family *Illecebraceae* is blended with the *Dianthaceae* (or *Caryophyllaceae*), with the result that the latter well-defined family is shorn of its distinctive features. We deem it better to retain the *Illecebraceae* and the *Dianthaceae* as two separate families; and their relationship is sufficiently shown by placing them in the same order (or, according to some authorities, in the same suborder).

It is debatable whether the *Illecebraceae* are reduced from the *Dianthaceae* or (as we prefer to believe) reduced from ancestors common to both families. We regard the primitive stock of the whole *Centrospermae* as having been characterised by monochlamydeous and sepaloid perianths, and the *Illecebraceae* as exhibiting the transition from these hypothetical ancestors to the plants with definitely heterochlamydeous perianths of the *Dianthaceae*. It is only in the genus *Corrigiola*, among the British members of the *Illecebraceae*, that the ordinary botanist would find a perianth which he would deem really heteroclamydeous.

About 20 genera and 110 species; warm-temperate and dry regions.

### Subfamilies of *Illecebraceae*

Subfamily 1. **Scleranthoïdeae** (p. 8). *Leaves* opposite, more or less connate, exstipulate. *Calyx* with 4—5 segments, tube campanulate, persistent. *Petals* or *staminodes* absent. *Stamens* inserted at the mouth of the calyx-tube. *Stigmas* 2. *Ovary* unilocular. *Ovules* 1—2 in each ovary, suspended from the end of a funicle arising basally. *Fruit* indehiscent with 1—2 seeds. *Embryo* curved round the endosperm.

Subfamily 2. **Illecebroïdeae** (p. 9). *Leaves* usually opposite, with membranous stipules. *Calyx* more or less coherent at the base only; segments 4—5, imbricate. *Staminodes* or *petals* usually 5, subulate or ligulate, alternating with the sepals and with the perfect stamens. *Stamens* inserted, like the staminodes, on a perigynous disc. *Stigmas* 5—2. *Fruit* dehiscent below or indehiscent, unilocular, 1-seeded. *Embryo* more or less curved.

## Subfamily 1. *SCLERANTHOÏDEAE*

**Scleranthoïdeae** Ascherson und Graebner *Fl. Nordost. Flachl.* 294 et 317 (1898); *Sclerantheae* DC *Prodr.* 377 (1828); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 69 et 92 (1889); *Scleranthaceae* Lindley *Nat. Syst.* ed. 2, 213 (1836).

For characters, see page 7. Only British genus:—*Scleranthus.*

## Genus 1. Scleranthus

**Scleranthus** L. [*Gen. Pl.* 130 (1737);] *Sp. Pl.* 406 (1753) et *Gen. Pl.* ed. 5, 190 (1754); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 92 (1889); [*Knawel* Dillenius *App. Cat. Giss.* 94 (1719)].

Perennial or annual herbs. *Leaves* opposite, more or less connate, exstipulate, subulate, often serratulate, pungent. *Peduncles* hairy on one side. *Flowers* monochlamydeous, ebracteate. *Sepals* 4—5, united, tubular, often contracted at the top of the tube, segments green with a white margin, strongly persistent. *Staminodes* or *petals* absent. *Stamens* 1—10, inserted at the mouth of the perianth-tube; when 5, antisepalous. *Stigmas* 2, capitate. *Ovary* unilocular, uniovulate. *Fruit* indehiscent, adherent to the hardened persistent perianth. *Seed* pendulous from a filiform basal funicle, lenticular; embryo annular.

About 10 species; Europe; Africa; western Asia; Australia, New Zealand.

### British species of *Scleranthus*

1. **S. perennis** (see below). Perennial. *Leaves* glaucous. *Perianth-segments* pubescent, obtuse, with a broad white margin.

2. **S. annuus** (page 9). Annual. *Leaves* subglaucous. *Perianth-segments* glabrous, acute, with a narrow whitish margin.

### 1. SCLERANTHUS PERENNIS. Plate 6

*Knawel incanum flore majore perenne* Ray *Syn.* ed. 3, 160, t. 5, fig. 1 (1724).

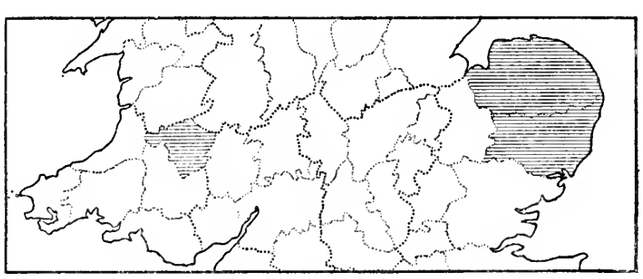
**Scleranthus perennis** L. *Sp. Pl.* 406 (1753)!; Smith *Eng. Bot.* no. 352 (1796); *Fl. Brit.* 458 (1800)!; *Eng. Fl.* ii, 283 (1824); Syme *Eng. Bot.* vii, 182 (1867); Rouy *Fl. France* xii, 13 (1910).

Icones:—Smith *Eng. Bot.* t. 352; Syme *Eng. Bot.* vii, t. 1176.

*Camb. Brit. Fl.* iii. *Plate 6.* (*a*) A small plant. (*b*, *c*) Flowers (enlarged). (*d*) Calyx enclosing ripening fruit. Norfolk (A. M. S.).

Exsiccata:—Billot 1197; Fries, xii, 62; Reichenbach, 284; Thielens et Devos, i, 100; Wirtgen, vii, 293 a; *Herb. Fl. Ingric.* viii, 241.

Perennial. *Shoot* glaucous, prostrate or decumbent. *Leaves* more acuminate and more strongly falcate than in *S. annuus*. *Flowers* not on the basal branches, about 5 mm. in diameter; June to October. *Perianth* pubescent, segments obtuse, with a conspicuous white margin which is much broader than in *S. annuus*, converging after flowering, obtuse. *Stamens* 10.



Map 3. Distribution of *S. perennis* in England and Wales

Rare; on grassland on dry, calcareous, sandy or gravelly or rocky soils; Suffolk and Norfolk; Wales—Radnorshire.

Central and southern Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; temperate Asia.

## 2. SCLERANTHUS ANNUUS. Knawel. Plate 7

*Polygonum selinoïdes* Gerard *Herball* 453 (1597); *Saxifraga anglicana alsines minimum genus daleschampi polygonum selinoïdes gerardi* Johnson *Kent* 2 (1629); *Polygonum exiguum* Ray *Cat. Cantab.* 121 (1660); *Knawel* Ray *Syn.* ed. 3, 159 (1724).

**Scleranthus annuus** L. *Sp. Pl.* 406 (1753)!; Smith *Eng. Bot.* no. 351 (1796); *Fl. Brit.* 458 (1800)!; *Eng. Bot.* no. 351 (1796); *Eng. Fl.* ii, 282 (1824); Syme *Eng. Bot.* vii, 181 (1867); Rouy *Fl. France* xii, 14 (1910).

Icones :—Smith *Eng. Bot.* t. 351; *Fl. Dan.* t. 504; Baxter, *Phaen. Bot.* vi, 439.

*Camb. Brit. Fl.* iii. *Plate 7.* (*a*) Plant in Flower. (*b*) Perianths (one enlarged). Jersey (E. W. H.).

Exsiccata :—Bourgeau (*Pl. d'Esp.*), 1342; Durieu, 338; Huter, 740, as *S. annuus* forma; Reichenbach, 283; Todaro, 488; Wirtgen, 294 a, as *S. intermedius*; *Herb. Fl. Ingric.* ii, 240.

Annual or biennial. *Shoot* subglaucous, erect or decumbent or prostrate. *Leaves* linear, connate, acute. *Flowers* 3—4 mm. in diameter; April to October. *Perianth* glabrous, segments acute, green with a narrow, pale border, spreading even after flowering. *Stamens* 1—10 usually 3—5.

(*β*) forma **hibernus** comb. nov.; *S. annuus* var. *hibernus* Reichenbach *Fl. Excurs. Germ.* 565 (1832); Rouy *Fl. France* xii, 15 (1910); *S. annuus* subsp. *biennis* Fries *Fl. Scan.* 118 (1835); *S. biennis* Reuter in *Compt.-Rend. Soc. Hallér.* 20 (1852—3); *S. annuus* var. *biennis* Syme *Eng. Bot.* vii, 182 (1867); *S. annuus* var. *fasciculatus* Gillot et Coste in *Bull. Soc. Bot. France* xxxviii, p. cxxvii (1891).

Icones :—Syme *Eng. Bot.* vii, t. 1175, as *S. annuus* var. *biennis.* This figure, like many others in the third edition of the *English Botany*, is very schematic: the illustrations of the original edition of the *English Botany* are much more life-like.

Exsiccata :—Billot, 3382, 3382 bis, as *S. biennis*; Fries, xii, 61, as *S. annuus* subsp. *biennis*; Huter, 741, as *S. biennis.*

Biennial. *Shoot* prostrate. *Sepals* with the scarious margin rather broader than in the annual form.

Grassy heaths and arable land, much scarcer than the annual form; Kent, Suffolk, Norfolk, Perthshire, and doubtless elsewhere.

Europe.

Locally abundant as a weed on light, dry, sandy or gravelly soils in arable land and waste places, and rare on grassy heaths; absent only from the extreme north of Great Britain; widespread in Ireland, but there, as in Great Britain, avoiding heavy or markedly calcareous soils.

Southern Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (up to 2000 m.), Russia, southern Europe; northern Africa; Asia; North America (not indigenous).

## Subfamily 2. *ILLECEBROÏDEAE*

**Illecebroïdeae** nobis; *Paronychioïdeae* Ascherson und Graebner *Fl. Nordost. Flachl.* 316 (1898); *Herniariineae* Rouy *Fl. France* xii, 2 (1910).

For characters, see page 7.

### Tribes of *Illecebroïdeae*

Tribe I. **Illecebreae** (see below). *Leaves* (at least the lower ones) opposite. *Petals* or *staminodes* setaceous. *Stigmas* 2. *Pericarp* membranous. *Fruit* indehiscent or dehiscent at the base.

Tribe II. **Corrigioleae** (p. 12). *Leaves* all or mostly alternate. *Petals* (or *staminodes*) white, oblong. *Stigmas* 3. *Pericarp* crustaceous. *Fruit* indehiscent.

## Tribe I. *ILLECEBREAE*

**Illecebreae** DC. *Prodr.* iii, 367 (1828) emend.; Ascherson und Graebner *Fl. Nordost. Flachl.* 316 (1898).

For characters, see above.

### Genera of *Illecebreae*

Genus 2. **Herniaria** (p. 10). *Sepals* green, obtuse, muticate. *Staminodes* or *petals* setaceous. *Fruit* indehiscent. *Embryo* annular.

Genus 3. **Illecebrum** (p. 12). *Sepals* white, acuminate. *Staminodes* or *petals* with long acuminations. *Fruit* dehiscent below. *Embryo* almost straight.

## Genus 2. Herniaria

**Herniaria** [Tournefort *Inst.* 507, t. 288 (1700)] L. *Sp. Pl.* 218 (1753) et *Gen. Pl.* ed. 5, 103 (1754); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 89 et 91 (1889).

Annual or perennial herbs. *Leaves* opposite at least below, unequal, entire, stipulate, stipules membranous. *Sepals* green, 5, often united at the base, equal or unequal, obtuse, muticate. *Staminodes* or *petals* setaceous. *Stamens* 5—2. *Style* short or absent. *Stigmas* 2. *Fruit* an achene, monospermic. *Seed* subglobose or reniform, erect; testa shining; embryo curved or annular.

About 20 species; Europe (except northern); western Asia; Africa. Mediterranean chiefly.

### British species of *Herniaria*

1. **H. ciliata** (see below). Perennial. *Stem* suffruticose below. *Stipules* rather more conspicuous and larger than in *H. glabra*. *Laminae* ciliate at least when young.

2. **H. glabra** (p. 11). Annual. *Stem* wholly herbaceous. *Laminae* more narrowly elliptical, more attenuate below, not or scarcely ciliate.

### 1. HERNIARIA CILIATA. Rupture-wort. Plate 8

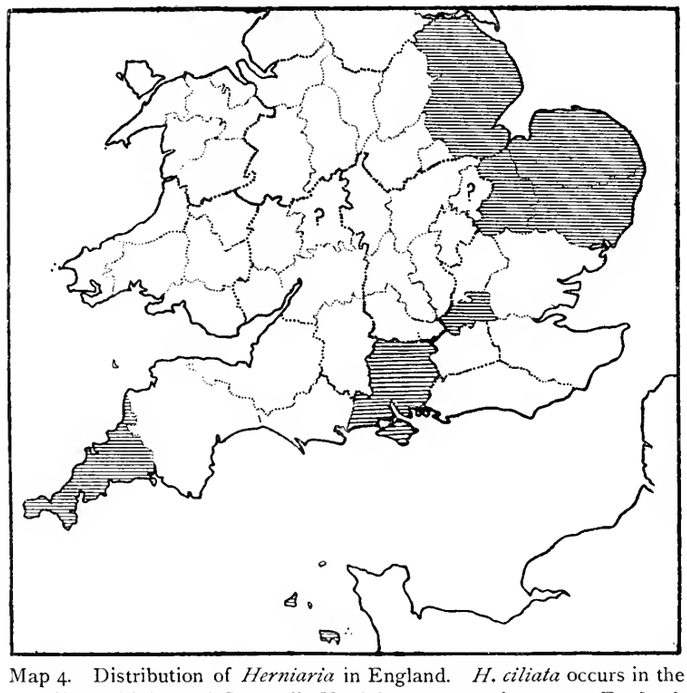
*Herniaria* Ray *Syn.* ed. 3, 160 (1724), *fide* Babington *loc. cit.* (*propter locum*) excl. syn.

**Herniaria ciliata** Babington in *Trans. Linn. Soc.* xvii, 453 (1837)! in *Eng. Bot. Suppl.* no. 2857 (1841); Syme *Eng. Bot.* vii, 179 (1867); Pugsley in *Journ. Bot.* lii, 330 et 332 (1914); *H. maritima* var. *ciliata* Daveau in *Bot. Soc. Brot.* x, 95 (1892); Rouy *Fl. France* xii, 8 (1910).

Icones:—Babington in *Eng. Bot. Suppl.* t. 2857, as *H. ciliata.* In leaf-shape, this approaches the var. *subciliata.*

Exsiccata:—Dickson, 58, as *H. glabra*; Smith herb. (partim), as *H. glabra.*

Perennial. *Root* eventually up to about 5 mm. in diameter. *Branches* prostrate, suffruticose below, diffuse, eventually more or less rooting, up to about 1·5 dm. long. *Stipules* conspicuous, soon becoming scarious, obtuse, rather larger than in *H. glabra*. *Laminae* broadly or rather narrowly elliptical, not or rarely attenuate below, ciliate at least when young, obtuse. *Flowers* rather larger than in *H. glabra*, usually less crowded, sessile or nearly so; late April to September. *Sepals* oblong or oblong-oval, margins glabrous or ciliate, obtuse or with a deciduous bristle at the tip. *Petals* or *staminodes* 5, distinct. *Anthers* usually tipped with red. *Seeds* lenticular, black, about twice as large as in *H. glabra.*



Map 4. Distribution of *Herniaria* in England. *H. ciliata* occurs in the Channel Isles and Cornwall, *H. glabra* var. *vera* in eastern England, and *H. glabra* var. *hirsuta* has occurred in Hampshire, Middlesex, and the Isle of Wight

This species is regarded by some authorities as a variety of *H. maritima* which, in the restricted sense, is only known to occur in Spain and Portugal. We agree with Mr Pugsley (*loc. cit.*) that *H. ciliata* and *H. maritima* are best kept as separate species.

(*a*) **H. ciliata** var. **babingtoni** var. nov.; *H. ciliata* Babington *Prim. Fl. Sarn.* 39 (1837) in sensu stricto!

*Laminae* broader than in var. *subciliata.* *Flowers* not so densely aggregated as in var. *subciliata.*

Channel Isles, Cornwall.

Western Europe, from Germany southwards.

(*b*) **H. ciliata** var. **subciliata** comb. nov.; *H. glabra* var. *subciliata* Babington *Prim. Fl. Sarn.* 39 (1839)!; *H. ciliata* var. *angustifolia* Pugsley *loc. cit.*

*Camb. Brit. Fl.* iii. *Plate 8.* (*a*) Portion of plant. (*b*) Leaves (two enlarged). (*c*) Portion of stem (enlarged). (*e*) Flower (enlarged). (*f*) Ovary (enlarged). Hort., origin Jersey (C. E. M.).

*Stem* often with irregularly placed adventitious roots. *Laminae* narrowly elliptical, margin more or less ciliate at least when young, subacute. *Flowers* usually more crowded together than in var. *babingtoni*, appearing in late April. *Sepals* ciliate.

Babington, as will be seen from the citation given above, referred this variety to *H. glabra* which indeed it approaches in its narrower leaves and its more crowded flowers. However, it is perennial; and the leaves are more or less ciliate at least when young. It is certainly intermediate between *H. ciliata* var. *babingtoni* and *H. glabra*. From *H. ciliata* var. *babingtoni* it is distinguished "at a glance" by the "dense aggregation of its clusters of flowers which are so thickly placed upon the short lateral branches." In *H. ciliata* var. *babingtoni*, "the clusters are arranged, either singly or two or three together, in the axil of each of the leaves which are sufficiently distant from each other to separate entirely the different bunches of clusters" (Babington *Prim. Fl. Sarn.* 39 (1839)). Although Syme does not definitely mention Babington's var. *subciliata*, it is evident from his remarks (*op. cit.* p. 180) that he includes the plant in his *H. ciliata*. Mr Pugsley (*loc. cit.*) reduced it to a variety of *H. ciliata* in 1914; and we believe that this view is correct. Babington's Latin diagnosis ("foliis plus minusve ciliatis") is extremely meagre; and this has led some botanists to ignore the plant. The plant, however, is sufficiently described by him (see above), and is obviously distinct from *H. glabra*. There are several specimens by Babington in *Herb. Univ. Cantab.*; and British botanists know quite well the plant which Babington intended. There is therefore no option but to retain the varietal name *subciliata* when it is transferred from *H. glabra* to *H. ciliata*.

Channel Isles and Cornwall, where it is often confused with *H. glabra* var. *vera* (see below).

Denmark, France (Forêt de Fontainebleau!), southern Germany, Spain, and perhaps elsewhere.

Rare and local; on sand dunes in the Channel Isles; on gravelly soil, on wall-tops, and in hedge-banks at the Lizard, in Cornwall.

Denmark, Germany, Holland, France, recorded for central Europe, Spain, Portugal.

## 2. HERNIARIA GLABRA. Plates 9, 10

*Herniaria* Gerard *Herball* 434 (1597); Ray *Syn.* ed. 3, 160 (1724), partim; *Millegrana major seu herniaria vulgaris* Parkinson *Theatr. Bot.* 446 (1640); *H. hirsuta* Dillenius in Ray *Syn.* ed. 3, 161 (1724) [= var. *hirsuta*].

**Herniaria glabra** L. *Sp. Pl.* 218 (1753)!, incl. *H. hirsuta*!; Smith *Fl. Brit.* 271 (1800) incl. *H. hirsuta* p. 272; Syme *Eng. Bot.* vii, 178 (1867) incl. *H. hirsuta* p. 183.

Annual. *Branches* prostrate or decumbent, herbaceous, more or less pubescent, up to about 12 cm. long. *Stipules* smaller and more inconspicuous than in *H. ciliata*. *Laminae* narrowly elliptical, attenuate below, more acute than in *H. ciliata*. *Flowers* very small, numerous and crowded; mid-July to September. *Sepals* subacute to obtuse. *Petals* or *staminodes* usually 5 or 4, sometimes reduced in number or even absent. *Anthers* yellow. *Stigmas* slightly divergent. *Seed* ovate, minute, black.

(*a*) **†H. glabra** var. **hirsuta** O. Kuntze in *Act. Hort. Petrop.* x, 230 (1887); *H. hirsuta* L. *l.c.*; Miller *Gard. Dict.* ed. 8, no. 2 (1768); Smith *l.c.*; Babington in *Trans. Linn. Soc.* xvii, 451 (1837); Townsend *Fl. Hampshire* ed. 2, 73 (1904); Rouy *Fl. France* xii, 9 (1900); in sensu stricto.

Icones:—Smith *Eng. Bot.* t. 1379, as *H. hirsuta.*

*Camb. Brit. Fl.* iii. *Plate 9.* (*a*) Portion of flowering shoot. (*b*) Leaves (enlarged). (*c*) Portion of stem (enlarged). (*d*) Closed flowers (enlarged). (*e*) Flower (enlarged). Cambridge Botanic Garden (R. I. L.).

Exsiccata:—Billot, 554, 554 bis, as *H. hirsuta*; Dickson, 13, as *H. glabra*; Schultz (*Fl. Gall. et Germ.*), 1450; Thielens et Devos, ii, 130, as *H. hirsuta*; Wirtgen, viii, 359, as *H. hirsuta.*

*Shoot* densely covered with short, straight, spreading hairs. *Stipules* and *flowers* rather larger than in var. *vera*. *Sepals* narrower, densely hairy. *Fruits* rather larger.

Very rare, and perhaps not indigenous; Isle of Wight (C. E. Salmon in *Journ. Bot.* l, 378 (1912)), Hampshire (probably extinct), Middlesex (probably extinct), Warwickshire (adventitious).

Recorded as follows:—Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; Africa; Asia.

(*b*) **H. glabra** var. **vera** Babington *Fl. Sarn.* 39 (1839); *H. glabra* L. *l.c.*; Miller *op. cit.* no. 1; Smith *Eng. Bot.* no. 206 (1794); *Fl. Brit. l.c.*; Babington in *Trans. Linn. Soc.* xvii, 452 (1837)!; Syme *l.c.*; Rouy *Fl. France* xii, 8 (1910); in sensu stricto.

Icones:—Smith *Eng. Bot.* t. 206, as *H. glabra*; *Fl. Dan.* t. 529, as *H. glabra.*

*Camb. Brit. Fl.* iii. *Plate 10.* (*a*) A small plant. (*b*) Leaves (enlarged). (*c*) Portion of stem (enlarged). (*d*) Five different flowers (enlarged). (*e*) Ovary (enlarged). Norfolk (W. G. C.).

Exsiccata:—Billot, 1877; v. Heurck, i, 37; Huter, 596 bis, as *H. glabra* var. *scabrescens*; Thielens et Devos, i, 19; *Herb. Fl. Ingric.* vi, 242; viii, 242 b, as *H. glabra* var. *scabriuscula*; Smith herb. (partim), as *H. glabra.*

*Stem* with very minute, decurved hairs. *Leaves* glabrous. *Flowers* smaller than in var. *hirsuta*. *Sepals* broader, glabrous or only with very minute hairs. *Fruits* smaller.

Rare; sandy soils, in waste places and arable land; Middlesex, Suffolk, Norfolk, Cambridgeshire, Huntingdonshire (introduced with seed and not permanent), Lincolnshire.

Foreign distribution doubtful: recorded as for the species.

Rare and local; on dry sandy or gravelly soils, as in fallow fields and waste places; Isle of Wight, Hampshire (perhaps extinct), Middlesex (perhaps extinct), northwards to Lincolnshire, at low levels only.

Recorded as follows:—Southern Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (recorded up to 1715 m.), Russia, southern Europe; Africa; Asia.

## Genus 3. Illecebrum

**Illecebrum** L. *Sp. Pl.* 206 (1753) et *Gen. Pl.* ed. 5, 97 (1754) pro min. parte; Bentham and Hooker *Gen. Pl.* iii, 13 (1880); Pax in Engler und Prantl iii, pt. 1 b, 89 et 91 (1889); Rouy *Fl. France* xii, 2 (1910); [*Corrigiola* Dillenius *App. Cat. Giss.* 169 (1719)].

Annual herbs. *Leaves* opposite. *Stipules* scarious. *Sepals* 5, with long, persistent, and often curled acuminations, white, thick. *Staminodes* or *petals* 5, broad below, acuminate. *Stamens* 5—3. *Style* very short or absent. *Stigmas* 2-lobed, capitate. *Fruit* dehiscent at the base only, monospermic. *Seed* erect. *Embryo* nearly straight.

If we followed the letter of the international rules of botanical nomenclature (cf. Art. 45) in the case of this genus, it would be necessary to transfer its name to *Paronychia*. Not only so, but, by the same article, many other well-known names (e.g., *Chelidonium*) would have to disappear or be applied to other genera with well-established names. To avoid highly inconvenient name-changes of this character, *nomina conservata* are established by the rules; and although *Illecebrum* and *Chelidonium* are not yet officially placed on this list, there can be no doubt that it is the intention of the framers of the rules to conserve all established generic names which, by the letter of the existing laws, are invalid. Consequently, we refrain from inverting the names *Illecebrum* and *Paronychia*; and we expect that these names will be retained as *nomina conservata* by the next international congress of botanists. We hope that British field-botanists, who in the last few years have been misled into adopting a number of unnecessary changes in the names of plants, will revert to the use of generic names which they know to be definitely established in botanical literature.

Only species:—*I. verticillatum.*

### 1. ILLECEBRUM VERTICILLATUM. Plate 11

*Polygala repens* Johnson in Gerard *Herball* 563 (1636); *Alsine floribus ad instar polygoni marina ad singulas alas albis* Merrett *Pinax* 5 (1666); *Polygonum serpyllifolium verticillatum* Ray *Cat. Angl.* 248 (1670); *Corrigiola* Dillenius *App. Cat. Giss.* 169 (1719); Ray *Syn.* ed. 3, 160 (1724).

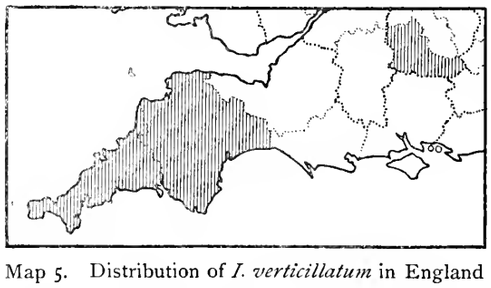
**Illecebrum verticillatum** L. *Sp. Pl.* 206 (1753)!; Smith *Fl. Brit.* 268 (1800)!; *Eng. Bot.* no. 895 (1801); *Eng. Fl.* i, 335 (1824); Syme *Eng. Bot.* vii, 180 (1867); Rouy *Fl. France* xii, 2 (1910); *Paronychia verticillata* Lamarck *Fl. France* iii, 231 (1778).

Icones:—Smith *Eng. Bot.* t. 895; Baxter *Phaen. Bot.* vi, 471; *Fl. Dan.* t. 335.

*Camb. Brit. Fl.* iii. *Plate 11.* (*a*) Fruiting branches. (*b*) Leaves (enlarged). (*c*, *d*) Fruits (enlarged). Berkshire (A. H. E.).

Exsiccata:—Billot, 556; Dickson, xii, 13 (the lax form), et 57 (the dense form); Fries, xii, 60; v. Heurck et Martinis, vi, 270; Reichenbach, 476; Schultz, i, 51; Wirtgen, ix, 475.

Annual. *Shoot* glabrous. *Branches* prostrate or decumbent, filiform, rooting, fertile ones floriferous almost from the base. *Stipules* small, membranous, ultimately laciniate. *Petiole* very short. *Laminae* oval to oboval, obtuse, rather thick. *Inflorescence* verticilloid, crowded. *Bracts* scarious. *Flowers* sessile, whorled, minute (3—4 mm. long); July to September. *Calyx* small (about 5 mm. in diameter), white or pinkish, with 5 segments; segments almost free, thickened, ending in a long, twisted bristle. *Staminodes* or *petals* reddish, alternisepalous. *Stamens* 5—3, antisepalous, filaments very short. *Style* very short. *Capsule* with 2 carpels. *Seeds* 1 to each fruit, oval, brown, shining; September and October.



Map 5. Distribution of *I. verticillatum* in England

Rare; in wet or damp sandy places, in Cornwall, Devonshire, and Berkshire.

Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; north-western Africa, from Tunis to the Canary Islands.

## Tribe II. *CORRIGIOLEAE*

**Corrigioleae** Fenzl in Endlicher *Gen. Pl.* 956 (1836—1840) as a subtribe; Ascherson und Graebner *Fl. Nordost. Flachl.* 316 (1898).

For characters, see page 9. Only genus:—*Corrigiola.*

## Genus 4. Corrigiola

**Corrigiola** L. [*Gen. Pl.* 340 (1737) non Dillenius;] *Sp. Pl.* 271 (1753) et *Gen. Pl.* ed. 5, 132 (1754); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 88 et 90 (1889); Rouy *Fl. France* x, 11 (1910).

Annual or perennial herbs. *Leaves* all or mostly alternate, glabrous; stipules scarious; petioles short or none. *Laminae* linear or oblong, rather succulent. *Sepals* 5, persistent, connate at the base, obtuse, margins white. *Petals* 5, oblong, white. *Stamens* 5. *Style* short or absent. *Stigmas* 3, very short. *Fruit* somewhat trigonous, indehiscent, 1-seeded. *Pericarp* thick, rather rugose. *Seed* large, 3-angled, suspended by a basal funicle. *Testa* membranous. *Embryo* annular.

About 12 species; central and southern Europe; South America; southern Africa. Only British species:—*C. littoralis.*

### 1. CORRIGIOLA LITTORALIS. Strapwort. Plate 12

**Corrigiola litoralis** L. *Sp. Pl.* 271 (1753)!; Withering *Bot. Arr.* ed. 2, 322 (1787); Smith *Eng. Bot.* no. 668 (1799); *Fl. Brit.* 339 (1800)!; *Eng. Fl.* ii, 113 (1824); Syme *Eng. Bot.* vii, 177 (1867); Rouy *Fl. France* xii, 11 (1910).

Icones:—Smith *Eng. Bot.* t. 668; Sibthorp and Smith *Fl. Graec.* t. 292.

*Camb. Brit. Fl.* iii. *Plate 12.* (*a*) Flowering shoot. (*b*) Young shoot. (*c*) Ground-leaves. (*d*) Portion of stem and leaves (enlarged). (*e*) Flowers (enlarged). (*f*) Fruit (enlarged). Devonshire (F. J. H.).

Exsiccata:—Billot, 19; Dickson, xiv, 10; Fries, xii, 59; Reichenbach, 482; Schultz, 443 bis; Thielens et Devos, i, 7; Todaro, 430.

Annual. *Shoot* rather glaucous. *Branches* prostrate or decumbent, slender, up to 45 cm. long. *Stipules* acuminate, membranous. *Laminae* linear to narrowly oboval. *Pedicels* short. *Flowers* July to September. *Calyx* small, with 5 segments, segments with scarious margins, persistent. *Petals* white, ligulate, a little longer than the sepals. *Stigmas* 3, sessile, very small. *Capsule* oval, brown, with 3 longitudinal lines.

Sandy and shingly places near the sea, subject to inundation of fresh water, in Cornwall and Devonshire; locally abundant.

Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; Africa; Asia Minor; central America (introduced).

Map 6. *C. littoralis* occurs in Cornwall and Devonshire

## Family 2. DIANTHACEAE

**Dianthaceae** Tanfani in Parlatore's *Fl. Ital.* ix, 239 (1892); *Caryophylleae* Jussieu *Gen. Pl.* 299 (1789) emend.; Bentham and Hooker *Gen. Pl.* 141 (1862); Rouy et Foucaud *Fl. France* iii, 86 (1896); *Caryophyllaceae* Reichenbach *Handb.* 296 (1837) emend.; Robinson and Fernald in Gray's *New Manual* 377 (1908).

Perennial or annual herbs, rarely undershrubs. *Stem* more or less thickened at the nodes. *Leaves* usually exstipulate (stipulate in *Polycarpon*, *Spergula*, and *Spergularia*), petioled or sessile, opposite and decussate or rarely in fours, often more or less connate at the base, usually entire. *Inflorescence* cymose, often a dichasial cyme. *Flowers* usually heterochlamydeous, rarely monochlamydeous by reduction, usually monoclinous, cyclic, usually obdiplostemonous, rarely partly or almost entirely dioecious, usually protandrous. *Sepals* $n$, persistent. *Petals* $n$, inserted on the disc, rarely absent. *Disc* of hypogynous or hemi-perigynous glands present and usually nectiferous. *Stamens* inserted on the disc, usually $n+n$, outer whorl usually antipetalous and the first to dehisce, rarely the inner whorl (and still more rarely some of the outer whorl also) suppressed; filaments usually free; anthers dehiscing longitudinally. *Ovary* superior, syncarpous, of $n$ or $n-1$ or $n-2$ carpels, carpels usually antipetalous; carpellary septa present and united to a central column when young, usually breaking down before maturity and leaving the ovules on their detached margins, occasionally (as in the higher or more specialised forms) more or less persistent in the mature fruit. *Gynophore* often (in the specialised forms) more or less distinct. *Styles* usually absent or free. *Stigmas* as many as the carpels. *Placentation* usually free-marginal[1], as described above (but cf. *Sileneae*). *Fruit* a capsule, unilocular or (especially in *Silene*) partially septate, dehiscing by as many or by twice as many valves or teeth as there are stigmas, rarely (as in *Cucubalus baccifer*) succulent. *Seeds* 4 or more to each carpel, rarely (as in *Polycarpon*) fewer. *Embryo* usually curved round the endosperm, rarely straight (as in the specialised *Diantheae*). *Cotyledons* narrow. ($n=5$ or 4.)

[1] This term more clearly expresses the facts of development than the usually accepted term "free-central."

We have little or no doubt that the *Dianthaceae* is a recently evolved family of plants. The species are very numerous, and very closely allied to one another. The genera and even the tribes are connected in the same way; and the framing of natural subdivisions of the family is in consequence the despair of systematic botanists. The difficulties are inherent, and are seen in all successful, recently-evolved groups of plants.

The flowers of such genera as *Dianthus*, *Silene*, and *Cucubalus* are highly specialised, as shown by the presence of a gynophore, the occasional dioecism, the marked differentiation of the claw and limb of the petals, the frequent presence of coronal ligules, the occasional zygomorphy, the usual oligomery of the gynoecium, and the straight ovary of the *Diantheae*. Hence we think there is no justification for an arrangement which begins the family with these genera (cf. Volume II, page 150).

About 55 genera and 1300 species; cosmopolitan.

### Tribes of *Dianthaceae*

Tribe I. **Polycarpeae** (see below). *Stipules* present, scarious. *Leaves* opposite or in fours. *Laminae* small, relatively broad. *Sepals* free or more or less united. *Petals* $n$, entire emarginate or 2-dentate, very small. *Stamens* often $n$ and antisepalous, or $n-1$ or $n-2$. *Style* united below. *Stigmas* $n-2$. *Capsule* dehiscing septicidally by as many valves as there are stigmas. ($n=5$.)

Tribe II. **Sperguleae** (p. 15). *Stipules* as in *Polycarpeae*. *Laminae* linear. *Sepals* $n$, polysepalous. *Petals* $n$, entire. *Stamens* usually $n+n$ or $n$, rarely fewer. *Styles* free. *Stigmas* $n$ to 2, usually $n$ or 3. *Capsule* dehiscing septicidally by as many teeth as there are stigmas. ($n=5$.)

Tribe III. **Sagineae** (p. 23). *Stipules* absent. *Laminae* usually linear. *Sepals* $n$, polysepalous. *Petals* $n$, entire. *Stamens* $n+n$, outer whorl antisepalous, or $n$ and antisepalous. *Style* absent or free. *Stigmas* either $n$ and antipetalous or $n-2$. *Capsule* dehiscing septicidally by as many values as there are stigmas. ($n=5$ or 4.)

Tribe IV. **Stellariëae** (p. 37). Differs from *Sagineae* chiefly in possessing *capsules* which dehisce by twice as many teeth or valves as there are stigmas. *Laminae* linear to broad. *Sepals* free or joined a little at the base. *Petals* entire or bifid or rarely somewhat jagged.

The preceding tribes are connected with the following ones by *Gypsophila* and its allies. Species of *Gypsophila* sometimes occur adventitiously in the British Islands.

Tribe V. **Lychnideae** (p. 64). *Stipules* absent. *Leaves* often petioled; laminae usually relatively broad. *Sepals* $n$, gamosepalous. *Petals* $n$, convolute or imbricate in bud, with narrow basal claw and upper spreading wide limb, often with ligules. *Stamens* $n+n$. *Gynophore* usually distinct. *Stigmas* $n$ to $n-2$. *Capsule* dehiscing septicidally or loculicidally by as many teeth as there are stigmas. ($n=5$.)

Tribe VI. **Sileneae** (p. 69). As in *Lychnideae*, but *flowers* sometimes zygomorphic, *stigmas* usually $n-2$ (sometimes $n$ in *Cucubalus maritimus*), *capsule* often with more or less persistent septa (at least below), and dehiscing by twice as many teeth as there are stigmas. ($n=5$.)

Tribe VII. **Diantheae** (p. 85). As in *Lychnideae* but *epicalyx* present, *petals* with ligules, twisted in bud, *stigmas* $n-3$, *capsule* dehiscing by twice as many teeth as there are stigmas, *embryo* usually straight. ($n=5$.)

## Tribe I. *POLYCARPEAE*

**Polycarpeae** DC. *Prodr.* iii, 373 (1828); Bentham and Hooker *Gen. Pl.* i, 143 et 152 (1862); Pax in Engler und Prantl *Pflanzenfam.* 69 et 85 (1889).

For characters, see above. Only British genus:—*Polycarpon.*

## Genus 1. Polycarpon

**Polycarpon** L. *Syst. Nat.* ed. 10, 881 (1759) et *Gen. Pl.* ed. 6, 42 (1764); diagn. emend.; DC. *Prodr.* iii, 376 (1828); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 86 (1889); *Mollugo* L. *Sp. Pl.* 89 (1753) et *Gen. Pl.* ed. 5, 38 (1754) partim; [*Anthyllis* Adanson *Fam. Pl.* ii, 271 (1763)].

Annual herbs. *Leaves* opposite or apparently whorled. *Inflorescence* bracteate, crowded. *Sepals* 5, keeled, margin scarious, apex cucullate. *Petals* 5, entire or emarginate, small and narrow. *Stamens* 3—5. *Ovules* several. *Capsule* dehiscing by the 3 carpels (i.e., septicidally). *Seeds* curved above, straight below.

6 or 7 species; temperate and subtropical. Only British species:—*P. tetraphyllum.*

### 1. POLYCARPON TETRAPHYLLUM. Allseed[1]. Plate 13

*Anthyllis marina incana alsinifolia* Johnson in Gerard's *Herball* ed. 2, 632 (1636).

**Polycarpon tetraphyllum** L. *Syst. Nat.* ed. 10, 881 (1759)!; *Sp. Pl.* ed. 2, 131 (1762); Hudson *Fl. Angl.* ii, 60 (1778); Smith *Fl. Brit.* 162 (1800)!; Syme *Eng. Bot.* ii, 133 (1864); Rouy *Fl. France* iii, 312 (1896); *Mollugo tetraphylla* L. *Sp. Pl.* 89 (1753).

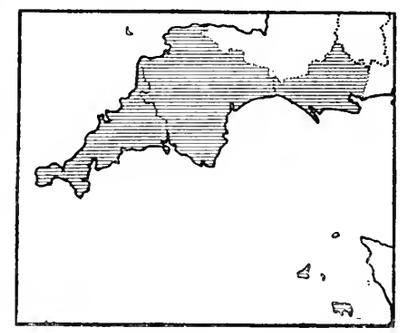
Icones:—Smith *Eng. Bot.* t. 1031; Sibthorp and Smith *Fl. Graec.* ii, t. 102.

*Camb. Brit. Fl.* iii. *Plate 13.* (*a*) Flowering shoot of the lax form. (*b*) Flowers (one enlarged). (*c*) Ovary (enlarged). Dorset (W. B. B.). (*d*) Flowering shoot of the dense form. Jersey (E. W. H.).

Exsiccata:—Billot, 1196; Durieu (*Pl. Sel. Hisp.-Lus.*), 357; Reichenbach, 1265; A. Schultz (*Fl. Istr.*), 57, as *P. tetraphyllum* var. *maritimum*; Schultz, i, 53; i, 53 bis, as *P. tetraphyllum* forma *minor condensata*; Welwitsch (*Fl. Lusit.*), 748, 1112.

Annual. *Shoot* glabrous, about 1—2 cm. *Stem* much branched from the base, erect or decumbent, branches divaricate. *Stipules* ovate-lanceolate, acuminate, scarious. *Petioles* very short. *Leaves* oboval to oval-oblong, lower ones and upper ones opposite and in pairs, the median ones often in fours, rarely all opposite *Bracts* very small. *Pedicels* longer than the calyx. *Flowers* about 3 mm. in diameter, very numerous; June to October. *Sepals* ovate, with scarious margins, mucronulate. *Petals* greenish-white, usually emarginate, shorter than the sepals, not contiguous, rarely absent. *Stamens* 3—5, usually 3. *Capsule* globose, shorter than the sepals. *Seeds* reniform, very small, finely rugose, brown.

Two forms occur in Jersey: these are probably (*a*) var. *laxum* and (*b*) var. *densum* of Rouy et Foucaud *op. cit.* p. 312. See Plate 13. Mr H. W. Pugsley (in *Journ. Bot.* lii, 329) identifies the latter with *P. tetraphyllum* var. *diphyllum* DC. *Prodr.* iii, 376 = *P. diphyllum* Cavanilles *Icones et Descr. Pl.* ii, 40, t. 151, fig. 1. The former has larger leaves which are more or less apparently tetramerous; and the internodes are longer. The latter is smaller, has shorter branches, often opposite leaves, and fewer and more densely arranged and rather larger flowers.



Map 7. Distribution of *P. tetraphyllum* in England

Dry sandy ground and waste places near the sea, sand-dunes; Channel Isles, Dorset, Devonshire, and Cornwall.

Germany (central and southern), France (including northern France), central and southern Europe; northern Africa; Asia Minor to Persia; East Indies; New Holland, and southern Africa (?indigenous); America (not indigenous).

## Tribe II. *SPERGULEAE*

**Sperguleae** Bartling in Bartling and Wendland *Beitr.* ii, 158 (1825) emend.; Grenier et Godron *Fl. France* i, 274 (1848).

For characters, see page 14.

#### Genera of *Sperguleae*

Genus 2. **Spergula** (see below). *Leaves* apparently whorled. *Petals* white. *Stigmas* 5.

Genus 3. **Spergularia** (p. 17). *Leaves* not apparently whorled. *Petals* usually lilac or purplish-pink. *Stigmas* 3.

## Genus 2. Spergula

**Spergula** [Dillenius *App. Cat. Giss.* 131, t. 7 (1719);] L. *Sp. Pl.* 440 (1753) et *Gen. Pl.* ed. 5, 199 (1754) partim; Presl *Fl. Sic.* 159 (1826); Fenzl in Endlicher *Gen. Pl.* 962 (1836—1840); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 85 (1889).

Annual herbs. *Leaves* linear or filiform, verticilloid owing to the non-development of the internodes of the axillary branches[2]. *Sepals* 5, margin membranous. *Petals* 5, white, entire. *Stamens* 5 or 5+5. *Stigmas* 5, alternisepalous. *Teeth of capsule* short, antisepalous.

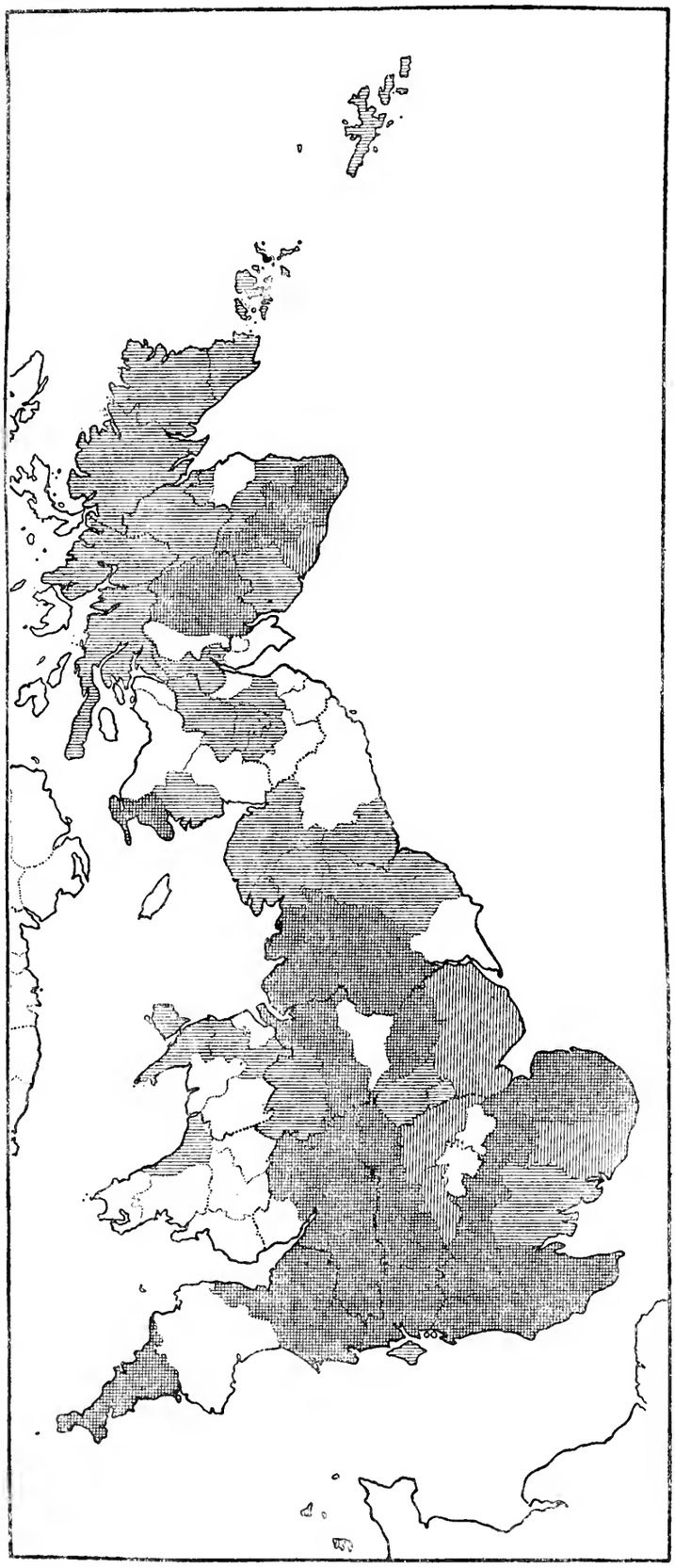
2 or 3 species; cosmopolitan. Only British species:—*S. arvensis.*

[1] This name is also in use for *Chenopodium polyspermum* (Volume II, page 155).

[2] Cf. Russel in *Bull. Soc. Bot. France* xxxvi, 424 (1889).

## 1. SPERGULA ARVENSIS. Corn Spurrey. Plates 14, 15

*Sagina spergula sive spurry belgarum et anglorum* Lobel *Adv.* 357 (1570); *S. spergula* Johnson in Gerard *Herball* ed. 2, 1125 (1636); *S. spergula major* Parkinson *Theatr. Bot.* 561 (1640); *Alsine spergula dicta major* C. Bauhin *Pinax* 251 (1671); Ray *Syn.* ed. 3, 351 (1724).



Map 8. *S. arvensis* occurs throughout Great Britain, and in most of the Irish counties. *S. arvensis* var. *sativa* occurs in the counties which are shaded with horizontal lines, *S. arvensis* var. *vulgaris* in those with vertical lines, and both varieties in those shaded most darkly. *S. arvensis* var. *nana* is indigenous in the Channel Isles. The full distribution of the varieties in Ireland is unknown

**Spergula arvensis** L. *Sp. Pl.* 440 (1753)!; Smith *Fl. Brit.* 503 (1800)!, incl. *S. pentandra*! (non al.); Syme *Eng. Bot.* ii, 126 (1864); Rouy et Foucaud *Fl. France* ii, 126 (1896).

Exsiccata:—Billot, 731, as *S. arvensis*; 3821, as *S. vulgaris*; Huter, Porta, et Rigo, 982, as *S. arvensis*; Reichenbach, 64, as *S. arvensis*; 65, as *S. vulgaris*; Todaro, 985, as *S. vulgaris*; Welwitsch (*Fl. Lusit.*), 812, as *S. arvensis* var.?; *Herb. Fl. Ingric.* i, 122, as *S. arvensis.*

Annual. *Shoot* glandular or not. *Stem* erect or decumbent, branched or simple. *Stipules* broad. *Leaves* linear, grooved underneath. *Flowers* up to 1·3 cm. in diameter; April to October. *Sepals* ovate. *Petals* ovate, rather obtuse, as long as or a little longer than the sepals. *Stamens* 5 or 5 + 5. *Capsule* subglobose, a little longer than the calyx. *Seeds* subglobose, minutely tuberculate or with white papillae, narrowly bordered.

An allied species, *S. pentandra* (L. *Sp. Pl.* 440 (1753) non Smith) was found in Ireland by Sherard (Dillenius in Ray *Syn.* ed. 3, 351 (1724)); and the specimen is preserved at Oxford (Druce and Vines *Dill. Herb.* 108 (1907)). The plant has not been found since in the British Isles, although it might be expected to occur in eastern or southern England. It is distinguished from *S. arvensis* by its non-grooved laminae, its lanceolate-acute petals, and its lenticular seeds surrounded with a white margin or wing.

(*a*) **S. arvensis** var. **sativa** Mertens und Koch *Deutschl. Fl.* iii, 360 (1831); Syme *Eng. Bot.* ii, 127 (1864); Rouy et Foucaud *Fl. France* iii, 296 (1896); *S. arvensis* Smith *Fl. Brit.* 502 (1800)!; *S. sativa* Boenninghausen *Prodr. Fl. Mon.* 135 (1824); *Arenaria arvensis* Wallroth *Sched. Crit.* 200 (1822).

Icones:—Smith *Eng. Bot.* t. 1536, as *S. pentandra*; Reichenbach, *Icon. Crit.* t. 501, fig. 704, as *S. arvensis.*

*Shoot* viscous. *Flowers* with a rather obnoxious odour. *Stamens* usually 10. *Seeds* minutely punctate, not papillate, with a distinct blackish margin about a quarter as wide as the rest of the seed.

Arable land throughout Great Britain, from the Channel Isles, Cornwall, and Kent, northwards to Zetland; Ireland—co. Galway and co. Mayo.

Europe (including Iceland), commoner in the north; Asia Minor (probably rare); North America (introduced from Europe).

(*b*) **S. arvensis** var. **vulgaris** Mertens und Koch *Deutschl. Fl.* iii, 360 (1831); Syme *Eng. Bot.* ii, 127 (1864); Rouy et Foucaud *Fl. France* iii, 296 (1896); *S. pentandra* Smith *Fl. Brit.* 503 (1800) excl. syn., non L.!; *S. arvensis* var. *β* Smith *Eng. Fl.* ii, 336 (1824); *S. vulgaris* Boenninghausen *Prodr. Fl. Monost.* 135 (1824); *S. arvensis* var. *trachysperma* Neilreich *Fl. N.-Ost.* 781 (1859).

Icones:—Smith *Eng. Bot.* t. 1535, as *S. arvensis*; Curtis *Fl. Lond.* ii, 91, as *S. arvensis*; *Fl. Dan.* t. 1033, as *S. arvensis*; *Svensk Bot.* t. 308, as *S. arvensis*; Reichenbach *Icon. Crit.* t. 511, fig. 705, as *S. vulgaris.*

*Camb. Brit. Fl.* iii. *Plate 14.* (*a*) Flowering shoot. (*b*) Open fruit. (*c*) Seeds (enlarged). Jersey (E. W. H.).

*Shoot* usually hairy but not viscous. *Stamens* usually less than 10. *Seeds* not or only obscurely winged, with prominent scattered white papillae when fresh, changing to black as the seed dries.

This variety seems to hybridise with var. *sativa*, for plants with mixed characters occur (e.g., in Cambridgeshire) when the two grow together. It may be that the confusion of the seeds in the plates of *Eng. Bot.* (in all the editions) is due to this circumstance.

Arable land; locally abundant in England, from the Channel Isles, Cornwall, and Kent northwards to Lancashire and Yorkshire; also recorded for Perthshire and Aberdeenshire; Ireland—co. Galway and co. Mayo.

Large forms may be named var. *vulgaris* subvar. *maxima* Rouy et Foucaud *op. cit.* p. 297 (= *S. maxima* [Weihe in litt., ex] Boenninghausen *Prodr. Fl. Monast.* 136 (1824)). This subvariety is figured in Reichenbach *Icon. Crit.* t. 513, fig. 706, as *S. maxima.* The specimen figured in our own plate seems to belong to this subvariety.

Denmark, Germany, France, central Europe, southern Europe; Asia; Africa; America; Australia.

(*c*) **S. arvensis** var. **nana** Linton in *Journ. Bot.* xlv, 380 (1907).

Icones:—*Camb. Brit. Fl.* iii. *Plate 15.* (*a, b*) Plants with ripening fruits. (*c*) Capsule (enlarged). (*d*) Seeds (enlarged). Guernsey (E. D. M.).

Ephemeral. *Stems* several, 2·5—15·0 cm. long, prostrate or decumbent. *Leaves* about 3—13 mm. long, rigid. *Pedicel* of the lower flowers about twice as long as the capsule. *Flowers*—late March to early May. *Sepals* broadly oval to oblong, obtuse, glandular-pubescent. *Stamens* 5, antisepalous. *Capsules* subglobose, up to about 3·5 mm. in diameter. *Seeds* densely papillose and rimmed as in var. *vulgaris* (Koch), but smaller; May.

Indigenous on light soils near the sea in the Channel Isles, growing with *Mibora*, *Romulea*, and other ephemeral and geophilous plants.

*S. arvensis* is a common weed of arable land on sandy soils, rare or absent on clayey and calcareous soils; throughout the British Islands, but local and rare in central Ireland. In Great Britain, var. *sativa* occurs from Cornwall and Kent to Zetland, var. *vulgaris* from the Channel Isles, Cornwall, and Kent to Aberdeenshire, being local in Scotland, and var. *nana* in Jersey and Guernsey on sand dunes and on light soils generally near the sea.

Faeröes, Iceland, Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 2309 m. in Switzerland), Russia, southern Europe; Africa; Asia; America and Australia (not indigenous).

## Genus 3. Spergularia

**Spergularia** [Persoon *Syn.* i, 504 (1805) as a section;] J. S. et C. B. Presl *Fl. Čechia* 94 (1819); Bentham and Hooker *Gen. Plant.* i, 152 (1862); Lebel in *Mém. Soc. Sc. Nat. Cherbourg* xiv, 30 (1868); nomen conservatum; *Arenaria* L. *loc. cit.* pro min. parte; *Alsine* [Tournefort *loc. cit.*, pro min. parte;] Crantz *loc. cit.*, pro min. parte; Hiern in *Journ. Bot.* xxxvii, 317 (1899); nec Scopoli; *Stipularia* Haworth *Syn. Pl. Succ.* 103 (1812) non Beauvois; *Lepidogonum* Wimmer *Schles. Fl.* i, 78 (1841); *Lepigonum* [sic] Fries [*Fl. Halland.* 159 (1817—1818) as a section; Wahlberg *Fl. Gothob.* 45 (1820) nomen;] *Fl. Suec. Mant.* iii, 32 (1842); Kindberg *Syn. Lepigon.*[1] 3 (1856); *Monogr. Lepigon.*[2] 6 (1863); *Buda* [Adanson *Fam. Pl.* ii, 507 (1763) incl. *Tissa*;] Dumortier *Fl. Belg.* 110 (1829); *Tissa* [Adanson *loc. cit.*, incl. *Buda*;] Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 85 (1889); *Corion* [Mitchell in *Act. Phys.-Med. Acad. Nat. Cur. Norimberg.* viii, app. 218 (1748);] Britton in *Journ. Bot.* xxix, 303 (1891); N. E. Brown in *Eng. Bot.* ed. 3, suppl., 47 (1891).

Perennial or annual herbs. *Leaves* opposite, not apparently whorled. *Sepals* 5, with scarious margins. *Petals* 5, lilac or purplish-pink, rarely white. *Stamens* usually 10 or 5, rarely fewer. *Stigmas* usually 3. *Capsule* splitting almost to the base, valves remaining entire.

We have given the synonymy of the generic name with exceptional fulness, as it illustrates the inconclusive attempts to arrive at a definite conclusion on the part of those systematists who place the principle of priority before everything else in the determination of generic names. If priority alone be taken into account in determining generic names, it would appear that the genus should be named *Corion*, as this was described by Mitchell in 1748. If pre-1753 names

[1] Dissertatio academica, Upsala.

[2] In *Nov. Act. Reg. Soc. Sc. Upsal.* ser. 3, iv.

be rejected, Adanson has two names to choose from, *Buda* and *Tissa*, each of which has had its advocates. If Adanson's names be rejected, *Stipularia* Haworth comes next, the adoption of which would throw the Rubiaceous genus *Stipularia* Beauvois into confusion. The international rules wisely conserve *Spergularia*, as this is the name which has found its way into botanical literature as a whole.

Before the days of *nomina conservata*, Babington (in *Journ. Bot.* ii, 95 (1864)) put in a plea for the adoption of Fries's ungrammatical name *Lepigonum*. He objected to Syme's citation (*loc. cit.*) of *Spergularia* from Persoon's *Synopsis*. Babington rightly stated that Persoon only used the name as a section of *Arenaria*, but curiously overlooked the fact that Fries did precisely the same.

About 20 species; cosmopolitan, chiefly in saline habitats.

### British series of *Spergularia*

Series i. **Rubrae** (see below). *Capsule* about as long as or only a little longer than the calyx. *Seeds* pyriform, not winged.

Series ii. **Marinae** (p. 22). *Capsule* 1·2—1·6 as long as the calyx. *Seeds* orbicular, winged, or (in hybrids) variable in shape and in breadth of wing.

### Series i. *Rubrae*

**Rubrae** nobis. For characters, see above.

### British species of *Rubrae*

1. **S. rupicola** (see below). Perennial. *Shoot* usually glandular-hairy. *Stipules* about as broad as long. *Calyx* a little shorter than the capsule. *Petals* lilac, concolorous. *Seeds* about as large (0·5—0·7 mm.) as in *S. salina*.

2. †**S. campestris** (p. 20). Biennial or perennial. *Shoot* usually somewhat glandular. *Stipules* relatively longer and narrower than in *S. rupicola*. *Calyx* usually a little shorter than the capsule. *Petals* purplish-pink, concolorous. *Seeds* as in *S. rubra*.

3. **S. rubra** (p. 20). Annual. *Shoot* usually not or but little glandular, usually less floriferous than in *S. campestris*. *Stipules* lanceolate, eventually silvery. *Calyx* a little shorter than the capsule. *Petals* pale lilac, concolorous. *Seeds* rather smaller than those of *S. rupicola*, rimmed for more than half the way round, smooth or nearly so.

4. **S. salina** (p. 21). Perennial. *Shoot* usually not or only a little glandular. *Stipules* about as broad as long. *Capsule* about as long as the calyx. *Petals* whitish at the base, purplish-pink towards the margin. *Seeds* about twice as large as those of *S. rubra* and *S. campestris*.

## 1. SPERGULARIA RUPICOLA. Plate 16

**Spergularia rupicola** Lebel ms. ex le Jolis in *Mém. Soc. Sc. Nat. Cherbourg* vii, 274 (1860); Lebel in *Mém. Soc. Sc. Cherbourg* xiv, 39 (1868); *Arenaria marina* var. *hirsuta* Gibson[1] in *Phytologist* i, 218 (1844)!; *S. rupestris* Lebel *Rech. Pl. Manche* (1848) ex Lebel *loc. cit.*; Syme *Eng. Bot.* ii, 132 (1864); non Cambessides; *Lepigonum rupestre* Kindberg *Syn. Lepigon.* 8 (1856); *Monogr. Lepigon.* 14 et 29, fig. 13 (1863); More in *Thirsk Bot. Exch. Club Rep. for 1861*, 9 (1862); *Lepigonum rupicolum* More in *Eng. Bot. Suppl.* no. 2977 (1864); Babington in *Journ. Bot.* iii, 82 (1865); *Spergularia lebeliana* Rouy in *Bull. Herb. Boiss.* iii, 305 (1896); *Alsine rupicola* Hiern in *Journ. Bot.* xxxvii, 318 (1899).

Perennial. *Root* stouter than in the other British species. *Shoot* usually densely pubescent and glandular, decumbent or suberect. *Stipules* about as broad as long, broadly triangular, entire, more or less silvery. *Laminae* linear, slightly mucronate, rather succulent. *Bracts* much shorter than the leaves and pedicels. *Pedicel* of the terminal flower about 2—3 times as long as the capsule. *Flowers* 1·3—1·5 cm. in diameter, larger than in *S. campestris*; May, appearing a little later than those of *S. campestris*. *Sepals* narrower than in the other British species, margin scarious. *Petals* lilac, concolorous, rather longer than the sepals. *Stamens* 5+5. *Capsule* a little longer than the calyx. *Seeds* obovate to pyriform, punctate, not winged, margin rimmed for about three-quarters of its length, about 0·5—0·7 mm. long.

So far as we can find, this plant is first mentioned by Samuel Gibson, in the *Phytologist* i, 218 (1844) where it is named *Arenaria marina* var. *hirsuta*. Gibson's herbarium[1] contains his original specimens; but the specimens are not so named. Gibson's plant came from Cornwall.

[1] Samuel Gibson's plants are preserved in the Belle Vue Museum, Halifax.

(α) subvar. **hirsuta** comb. nov.; *Arenaria marina* var. *hirsuta* Gibson *loc. cit.*, in sensu stricto!

Icones:—More in *Eng. Bot. Suppl.* t. 2977, as *Lepigonum rupicolum.*

*Camb. Brit. Fl.* iii. *Plate 16.* (*a*) Flowering shoot of an erect form. (*b*) Flowering shoot. (*c*) Stipules (one enlarged). (*d*) Calyx enclosing ripe capsule. (*e*) Ovaries (one enlarged). (*f*) Seeds (enlarged). *b—f* belong to the trailing form. Jersey (E. W. H.).

Exsiccata:—Lebel (in Herb. Mus. Paris), as *S. rupestris* (*vel rupicola*) (fide Kindberg *op. cit.*); Linnaeus, in Herb. Mus. Holm., as *Arenaria media* (fide Kindberg *op. cit.*).

*Shoot* glandular-pubescent.

"In Jersey, it usually grows in the chinks of granite walls and in the interstices of rocks near the sea: in this form it is not a showy plant. It also grows on sandy soil near the sea: it then grows in masses, and is by far the handsomest of the British species." (E. W. H., *in litt.*)

The common form of the species both at home and abroad.

(β) subvar. **glabrescens** comb. nov.; *Lepigonum rupestre* var. *glabrescens* [Lebel ex] Brébisson *Fl. Normand.* ed. 4, 57 (1869); *Corion rupestre* var. *glabrescens* N. E. Brown in *Eng. Bot.* ed. 3, suppl. 49 (1891).

*Shoot* glabrous or nearly so, not or very little glandular.

Neither Lebel nor Kindberg, in the works here cited, have a "var. *glabrescens*," though we find this name attributed to them by several authors. Both state in their descriptions that the plant may be either glandular or glabrescent.

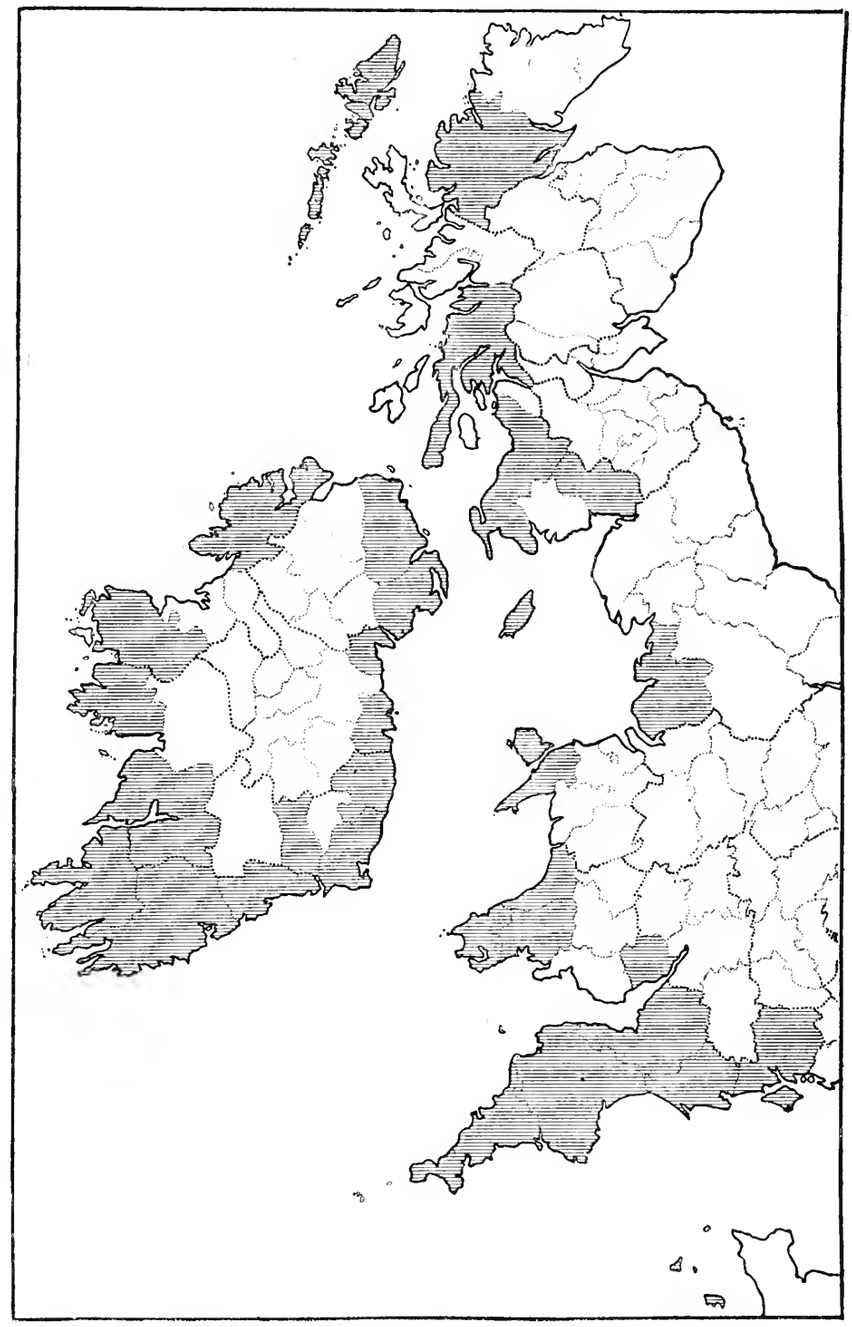
Very rare; Plymouth, Devonshire. France.

On spray-washed rocks, cliffs, and walls, near the sea, rarely on sand-dunes; from the Channel Isles, Isle of Wight, and Cornwall, along the western coast, northwards to the Hebrides; also recorded for Norfolk, Edinburghshire, and Aberdeenshire; Ireland —local around the coast and inland at Lough Neagh.

Northern and western France, Spain, Portugal, Italy.

***S. rupicola* × *salina*** comb. nov.; *S. rupestris* × *salina* Pugsley in *Journ. Bot.* xlix, 365 (1911)!

*Shoot* glandular. *Stipules* acute to acuminate. *Laminae* not mucronate. *Inflorescence* many-flowered, rather lax. *Pedicels* of the lower flowers longer than the calyx. *Petals* rose-coloured above, white at the base, intermediate in size between those of the putative parents. *Seeds* not known.



Map 9. *Spergularia rupicola* occurs on the coasts (chiefly coastal rocks and cliffs) of the counties which are shaded

As the species of this genus and particularly those of the series *Rubrae* are very closely allied, it is highly probable that hybrids of them are much commoner than the records indicate; but the fact is not usually recognised that the more closely species are allied the more difficult are their hybrids to detect, although the more likely are these hybrids to occur.

Once found; Lyme Regis, Dorset. Not known elsewhere.

## 2. †SPERGULARIA CAMPESTRIS. Plate 17

**Spergularia campestris** Willkomm et Lange *Prodr. Fl. Hisp.* iii, 165 (1880) non Ascherson; *Lepigonum diandrum* Kindberg *Syn. Lepigon.* 7 (1856) excl. syn. Gussone; *L. campestre* Kindberg *Monogr. Lepigon.* 15 et 35, fig. 23 (1863); *S. atheniensis* [Ascherson ex Schweinfurth *Beitr. Fl. Aethiop.* 267 et 305 (1867) nomen;] Halácsy *Fl. Graec.* i, 251 (1900); Druce in *Bot. Exch. Club Brit. Rep. for 1906*, p. 197 (1907); in *Journ. Bot.* li, 137 (1913); *S. rubra* subsp. *atheniensis* Burnat *Fl. Alpes-Marit.* i, 271 (1892); Rouy et Foucaud *Fl. France* iii, 310 (1896).

Icones:—*Camb. Brit. Fl.* iii. *Plate 17.* (*a*) Flowering shoot. (*b*) Lamina (enlarged). (*c*) Stipules (two enlarged). (*d*) Sepals (enlarged). (*e*) Persistent calyx containing capsule (enlarged). (*f*) Seeds (enlarged). *a*—*f* = an erect form. (*g*) Flowering shoot. (*h*) Seeds (enlarged). *g*—*h* = a trailing form. Jersey (E. W. H.).

Exsiccata:—de Heldreich (*Fl. Attica*), as *S. rubra* var. *atheniensis*; (*Herb. Graec. Norm.*), 831, as *S. campestris* (ann. 1885); Todaro, 1246, as *Lepigonum campestre.*

Closely allied to *S. rubra*, but a biennial or short-lived perennial plant. *Shoot* tufted, much branched, very floriferous, glandular, prostrate or ascending or erect. *Stipules* broadly triangular, short, connate below, often becoming split when old, dull brownish-white. *Laminae* linear, flat, slightly mucronate, longer than in *S. rubra* or *S. salina.* *Inflorescence* many-flowered, lateral branches rather long, bending over at maturity. *Pedicel* of the lower flowers about twice as long as the capsule. *Flowers* about 1 cm. in diameter, appearing a little later than in *S. rubra*, and earlier than in *S. rupicola*; May and June. *Sepals* much narrower than the petals, scarious at the margin. *Petals* purplish-pink, concolorous, about as long as the sepals, a little larger than those of *S. rubra.* *Capsule* almost as long as or a little longer than the persistent calyx. *Seeds* somewhat pyriform, compressed, rimmed, minutely tuberculate, ultimately dark brown or black, scarcely distinguishable from those of *S. rubra.*

The plant varies somewhat in habit in its Jersey station. "Where the plant finds slight shelter it grows upright rather like a *Spergula*, but where exposed it forms flat and almost circular pads of considerable size. On dry banks at some distance from the sea a hanging form is found" (E. W. H., *in litt.*).

Mr Hunnybun informs us that this plant grew on the sea-front near the large hôtel at St Helier, Jersey, until the station was destroyed by improvements. He further states that it still grows abundantly all over the quay at St Aubin harbour, Jersey, and that he found the plant on a bank about a mile (1·6 km.) from St Aubin quite in the country. As Rouy and Foucaud (*loc. cit.*) do not admit the plant as a native of northern France, it is possible that it is not indigenous in Jersey. There are several derelict harbours in Jersey, said to have been partially built with stone brought from northern France; and it is possible that the plant was introduced into Jersey from northern France by this means. The plant has also been found at Par, in Cornwall, where many other aliens occur. We have not seen specimens from Aldeburgh, Suffolk, where it is also said to have been found.

In the interstices of the granite pavement at the quay of St Aubin, Jersey, on a dry bank a little distance from the sea, and formerly on the sea-front at St Helier, Jersey, but perhaps not indigenous; Par, Cornwall, not indigenous. Recorded also for Aldeburgh, Suffolk.

France (adventitious in the north, *fide* Rouy et Foucaud, *loc. cit.*, indigenous in the south), southern Europe generally; Egypt, Abyssinia, Cape Colony.

## 3. SPERGULARIA RUBRA. Sand Spurrey. Plate 18

*Spergula flore rubro* Johnson *Cant.* 28 (1632); *Spergula purpurea* J. Bauhin *Hist.* iii, 722 (1651); Ray *Syn.* ed. 3, 351 (1724).

**Spergularia rubra** J. S. et C. B. Presl *Fl. Čechia* 94 (1819); Syme *Eng. Bot.* ii, 129 (1864); Lebel in *Mém. Soc. Sc. Cherbourg* xiv, 36 (1868); *Arenaria rubra* var. *campestris* L. *Sp. Pl.* 423 (1753); *Ar. rubra* Jacquin *Enum. Stirp.* 74 (1762); Withering *Nat. Arr. Brit. Pl.* ed. 3, ii, 422 (1796); Smith *Fl. Brit.* 479 (1800); Persoon *Syn.* 504 (1805); *Alsine rubra* Crantz *Instit.* ii, 407 (1766) excl. var. *β*; Wahlenberg *Fl. Suec.* i, 281 (1824) excl. var. *media*; Reichenbach *Fl. Germ. Excurs.* i, 566 (1832); Hiern in *Journ. Bot.* xxxvii, 318 (1899); *Arenaria campestris* Allioni *Fl. Pedem.* ii, 114 (1785); *Lepigonum rubrum* Fries *Mant.* iii, 33 (1842); Kindberg *Syn. Lepigon.* 5 (1856); *Monogr. Lepigon.* 15 et 40, fig. 29 (1863); *Spergularia campestris* Ascherson in *Bot. Zeit.* xvii, 292 (1859) non Willkomm et Lange; *S. rubra* subsp. *campestris* Rouy et Foucaud *Fl. France* iii, 309 (1896).

Icones:—Syme in *Eng. Bot.* ii, t. 254.

*Camb. Brit. Fl.* iii. *Plate 18.* (*a*) Flowering shoot. (*b*) Persistent calyx surrounding the ripening capsule (enlarged). (*c*) Seeds (enlarged). Isle of Wight (E. W. H.).

Exsiccata:—Billot, 1840; Fries, viii, 36, as *Lepigonum rubrum*; *Herb. Fl. Ingric.* i, 124.

Annual. *Shoot* glandular or not. *Basal rosette* of leaves present. *Stipules* narrowly triangular, eventually silvery. *Laminae* not succulent. *Pedicels* usually about as long as the calyx. *Flowers* 0·6—1·0 cm. in diameter; May to September. *Sepals* lanceolate. *Petals* pale lilac, concolorous, obovate, about as long as or a little shorter than the sepals. *Stamens* usually 10 or 5. *Capsule* about as long as the calyx or a little longer. *Seeds* (3—5 mm.), pyriform, punctate or smooth, rimmed.

Not uncommon on light, dry, sandy soils; heaths, commons, roadsides, and arable land; northwards to Orkney, rare in northern Scotland; very local in Ireland—co. Cork, co. Wexford, Queen's co., co. Armagh, co. Down, co. Antrim, co. Londonderry.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 2310 m. in Switzerland), Russia, southern Europe; northern Africa; Asia; North America.

## 4. SPERGULARIA SALINA. Small-flowered Sea Spurrey. Plates 19; 20

**Spergularia salina** J. S. et C. B. Presl *Fl. Čechia* 95 (1819) *fide* Mertens und Koch *Deutschl. Fl.* iii, 295 in obs. (1831); *Arenaria rubra* var. *marina* L. *Sp. Pl.* 423 (1753) partim; *Ar. marina* Roth *Fl. Germ.* i, 189 (1788) partim; Smith *Fl. Brit.* 480 (1800) partim; Wallroth *Sched. Crit.* 201 (1822) excl. syn. pl.; nomen confusum; *Ar. media* Withering *Arr.* ed. 3, ii, 422 (1796) partim non L., nomen confusum; *Lepigonum medium* Wahlberg *Fl. Gothob.* 46 (1820) gen. descr. nulla; More in *Thirsk Exch. Club Rep. for 1861*, 8 (1862); *Arenaria salina* Seringe ms. ex DC. *Prodr.* i, 401 (1824); Reichenbach *Fl. Germ. Excurs.* 566 (1832); *Alsine marina* var. *minor* Koch *Syn.* 111 (1835); *Lepigonum salinum* Fries *Fl. Suec. Mant.* iii, 34 (1842)!, incl. *L. neglectum*!; Kindberg *Monogr. Lepigon.* 14 et 36, fig. 27 (1863); Lange *Dansk. Fl.* 302 (1856—1859); *L. neglectum* Fries *loc. cit.* (1842)! incl. *L. salinum*; Kindberg *Syn. Lepigon.* 6 (1856); *Spergularia neglecta* Syme *Eng. Bot.* ii, 129 (1864) excl. t. 255; *S. media* Boissier *Fl. Orient.* i, 733 (1867); *S. dillenii* Lebel in *Mém. Soc. Sc. Cherbourg* xiv, 43 (1868); *Alsine media* Hiern in *Journ. Bot.* xxxvii, 318 (1899) non L.; *S. dillenii* race *salina* Rouy et Foucaud *Fl. France* iii, 304 (1896).

Icones:—*Fl. Dan.* t. 2231, as *Arenaria marina.*

*Camb. Brit. Fl.* iii. *Plate 19.* (*a*) Flowering shoots. (*b*) Stipules (enlarged). (*c*) Laminae (enlarged). (*d*) Calyx with capsule (enlarged). Jersey (E. W. H.). (*e*) Seeds (enlarged). Jersey (E. W. H.). (*f*) Flowering shoot. (*g*) Portion of stem with stipules and laminae (enlarged). (*h*) Calyx and capsule (enlarged). (*i*) Seeds (enlarged). Somerset (E. W. H.).

Exsiccata:—Billot, 3344; 3539, as *Arenaria rubra* var. *marina*; Fries, viii, 37, as *Lepigonum medium*; xiv, 42, as *L. salinum*; xv, 46, as *L. neglectum*; v. Heurck et Martinis, viii, 352, as *S. salina*; Reichenbach, 477, as *Alsine marina*; Wirtgen, viii, 328, as *L. medium*; viii, 329, as *L. salinum.*

Perennial. *Shoot* glabrous or more or less glandular. *Root* often stout and strong. *Branches* prostrate or decumbent, compressed a little, terete. *Stipules* broadly triangular, about as broad as long. *Laminae* linear, plano-convex, up to about 2 cm. long, rather succulent, dark green. *Inflorescence* few-flowered. *Pedicel* of the lower flowers about as long as the calyx. *Flowers* about 0·6—0·8 cm. in diameter, appearing a little later than those of *S. marginata*; June to September. *Sepals* rather longer and rather narrower than the petals. *Petals* purplish-pink with a white base. *Stamens* 4—7, often 5. *Capsule* about as long as or a little longer than the persistent calyx. *Seeds* broadly pyriform or elliptical, rimmed or not, either smooth or with minute tubercles especially at the margin of the rim, brown, wingless, rather larger than those of *S. rubra.*

This plant has been the subject of much dispute among British botanists. So far, however, as our own experience goes, we have only to say that we have never experienced any difficulty in determining it on the salt-marshes of Great Britain and France. One of the difficulties seems to arise from the erroneous assumption that *Lepigonum neglectum* Kindberg and *L. salinum* Kindberg are two different plants: Kindberg (*Monogr.* pp. 36 and 37) himself, however, plainly shows that they are one and the same. Other difficulties arise from a vain attempt to distinguish the varieties named in Syme's *English Botany.* Syme (to some extent following More and Fries), however, strongly hints that he himself attached very little importance to those varieties. Still further difficulties arise from what we feel compelled to regard as wrong descriptions in the books. It is often stated that the plant is annual: we find it to be perennial. It is also often stated that some of its seeds are winged; but we have never observed winged seeds in the numerous fresh and dried plants we have examined, though we admit that plants which we infer to be hybrids of this species and *S. marginata* occasionally occur which possess both winged and wingless seeds. Finally, confusion arises because of incomplete knowledge regarding the variation which the species exhibits.

Judging again from our own observations, we find that some individuals are glandular and others eglandular, and that some have smooth seeds and others minutely tubercled seeds. These variations are possibly Mendelian in their hereditary behaviour: they seem to be transmitted whole; and they exist in nature in every possible combination. Variations of this nature are not amenable to the ordinary methods of naming adopted by systematists; and it is, in our judgment, best in such cases to adopt some symbolical method of nomenclature. In time, we hope that a universal system will be invented for cases of this kind. At present, let us name the glandular individuals "G" and the eglandular ones "g," and the rough-fruited ones "T" and the smooth-fruited ones[1] "t." This would permit us to name the four possible combinations of these characters: GT (the glandular form with tuberculate seeds), gT (the eglandular form with tuberculate seeds), Gt (the glandular form with smooth seeds), and gt (the eglandular form with smooth seeds). We have observed all four forms on the salt-marshes near Hunstanton, in Norfolk.

[1] This is much rarer than the rough-fruited form among which it grows. It includes *Lepigonum leiospermum* Kindberg *Monogr.* 23, fig. 10 (1863) and *Corion marinum* var. *leiosperma* N. E. Brown in *Eng. Bot.* ed. 3, suppl. 48 (1891).

In addition to such hereditary variations, the plant, of course, varies a great deal in response to the situation in which it grows: in the shelter of larger plants and in wet mud, large individuals occur with comparatively long internodes, whilst in drier and exposed situations the individuals are prostrate, small, and the internodes very short. There is no reliable evidence that variations of this kind, at least among the higher plants, are inherited.

The inland stations of this species are of considerable ecological interest. In Berkshire, the plant occurs in a flat marshy meadow along with the following species:—*Tolypella glomerata*, *Sagina nodosa*, *Ranunculus sceleratus*, *Apium graveolens*, *Scirpus compressus*, *S. maritimus*, and *Carex distans*. Mr G. C. Druce (*Fl. Berksh.* 103) thinks that the plant was conveyed to this place by birds, and that its continued existence there is due to the saline nature of the habitat.

In Worcestershire, the plant occurs by the side of the Droitwich Canal. "How it got there is a matter of speculation: probably the seeds were brought there through the agency of natural dispersion, and finding a congenial locality, owing to the saline conditions of the place, have reproduced their kind." The plant occurs also on Defford Common "where a salt spring once existed." Other halophytes or hemihalophytes occurring in saline habitats of Worcestershire are:—*Atriplex glabriuscula* var. *babingtoni*, *Glaux maritima*, *Glyceria maritima*, and *Juncus compressus* var. *gerardi*. See Amphlett and Rea *The Botany of Worcestershire* (1909), p. 59 *et passim*.

In Cheshire, the species also occurs in inland localities, as "by canals and roads, etc., particularly in the salt district" of Northwich and Winsford (de Tabley in *Fl. Cheshire* 54 (1899)).

Not uncommon on the drier edges of salt-marshes in nearly all the maritime counties of the British Islands; rare on the wetter parts of salt-marshes; northwards to Orkney; very local in brackish inland localities, as in Berkshire, Worcestershire, and Cheshire.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; northern Africa; Asia; America.

*S. marginata* × *salina* (see below); *S. rupicola* × *salina* (p. 19).

## Series ii. *Marinae*

**Marinae** nobis. For characters, see page 18.

### British species and hybrid of *Marinae*

***S. marginata* × *salina*** (see below). *Capsules* (when fertile) intermediate in size between those of the putative parents. *Seeds* usually dimorphic, some wingless and others winged, rarely all with very narrow wings or none at all.

5. **S. marginata** (p. 23). *Capsules* markedly longer than the calyx. *Seeds* suborbicular, winged.

***S. marginata* × *salina*** hybr. nov.; *Arenaria glandulosa* Jacquin *Hort. Schoenbr.* iii, 56 (1798); *Lepigonum glandulosum* Kindberg *Monogr. Lepig.* 14 et 16, fig. 2 (1863); *S. dillenii* Rouy et Foucaud *Fl. France* iii, 303 (1896) excl. race *salina*, et excl. syn. *L. medium* Fries et *L. leiospermum* Kindberg.

Icones:—More in *Eng. Bot. Suppl.* t. 2978, as *Lepigonum salinum* (repeated in Syme *Eng. Bot.* t. 255, as *S. neglecta*); Jacquin *Hort. Schöndr.* t. 355, as *Arenaria glandulosa*.

*Camb. Brit. Fl.* iii. *Plate 20.* (*a*) Portion of flowering shoot. (*b*) Portion of shoot with stipules and two laminae (enlarged). (*c*) Calyx with barren capsule (enlarged). (*d*) Calyx with fertile capsule (enlarged). (*e*) Seeds (enlarged). Isle of Wight (E. W. H.).

Exsiccata:—Lojacono (*Pl. Sic. Rar.*), as *Lepigonum heterospermum*.

Perennial, often a very much larger plant than either *S. salina* or *S. marginata*. *Shoot* often strongly glandular, especially on the younger portions. *Branches* usually prostrate, somewhat compressed, slightly 2-ribbed. *Stipules* comparatively smaller, narrower, and more acute than in *S. salina*. *Laminae* nearly terete, thicker and longer than in *S. salina*. *Inflorescence* more elongate than in *S. salina* and with more flowers. *Pedicel* of the lower flowers a little longer than the persistent calyx. *Flowers* about 1 cm. in diameter; May to August. *Sepals* about as broad and as long as the petals. *Petals* rose-purple, with a paler almost white base, a little larger than in *S. salina*. *Stamens* usually 10, obdiplostemonous. *Capsules* often of two kinds; some about as long as the persistent calyx and containing many abortive seeds, others a little longer than the calyx and containing fertile seeds. *Seeds* dimorphic, mostly wingless and pyriform, a few suborbicular and surrounded by a membranous and radially marked wing, all with a more or less thickened rim, smooth or nearly so.

Merely glandular forms of *S. marginata* should not be referred to *S. marginata* × *salina*.

Possibly the two following plants should also be referred to this putative hybrid:—*S. marginata* var. *angustata* Clavaud *Fl. Gironde* in *Act. Soc. Linn. Bordeaux* xxxv, 403 (1881) and *Lepigonum marinum* var. *apterum* Marshall in *Journ. Bot.* xxxix, 268 (1901) which resemble *S. marginata* in habit, but have shorter capsules and the wing of the seed rudimentary or absent.

Rare, on salt-marshes and spray-washed rocks; Jersey, Isle of Wight, Somerset, and possibly elsewhere.

Scandinavia, Denmark, France; Africa; and probably elsewhere.

### 5. SPERGULARIA MARGINATA. Large-flowered Sea Spurrey. Plates 21; 20

*Spergula marina* Dalechamp *Hist. Plant.* 1385 (1586); cf. Johnson in Gerard *Herball* ed. 2, 1125 (1633); *Alsine spergula major maritima flore violacea* Morison *Hist.* ii, 551 (1680); *Spergula marina nostras* Ray *Hist.* 1034 (1688); *Alsine spergula facie media* C. Bauhin *Pinax* 251 (1671); Ray *Syn.* ed. 3, 351 (1724); *Arenaria foliis linearibus longitudine internodiorum* L. *Hort. Cliff.* 173 (1737).

**Spergularia marginata** Kittel *Taschenb.* ed. 2, 1003 (1844); Syme *Eng. Bot.* ii, 131 (1864) excl. t. 257; Rouy et Foucaud *Fl. France* iii, 302 (1896); *Arenaria rubra* var. *marina* L. *loc. cit.*, partim; *Ar. media* Linn. herb., non *Sp. Pl.* ed. 2, 606 (1762); DC. *Prodr.* iii, 422 (1822); Wallroth *Sched. Crit.* 202 (1822); nomen confusum; *Ar. marina* Allioni *Fl. Pedem.* ii, 114 (1785) partim; Roth *loc. cit.*, partim; Withering *Arr.* iii, 422 (1796) partim; Persoon *Syn.* 504 (1805); non Wallroth; nomen confusum; *Ar. marginata* DC. *Fl. France* iv, 793 (1805); *Lepigonum marinum* Wahlberg *Fl. Gothob.* 47 (1820) descr. gen. nulla; Fries *Fl. Suec. Mant.* iii, 35 (1842); Kindberg *Syn. Lepig.* 12 (1856); *Monogr. Lepig.* 14 et 18, fig. 6 (1863) excl. syn. Cambessides; *Ar. marina* var. *succosior* Mertens und Koch *Deutschl. Fl.* iii, 294 (1821); *Alsine marina* Wahlenberg *Fl. Suec.* i, 281 (1824); Hiern in *Journ. Bot.* xxxvii, 318 (1899); excl. syn. *Ar. media* L.; non Reichenbach; *S. media* C. B. Presl *Fl. Sic.* i, 161 (1826) excl. syn. L.; ? *Buda marina* Dumortier *Fl. Belg.* 110 (1827) nomen; *Alsine marginata* Reichenbach *Fl. Germ. Excurs.* 566 (1830); *Al. marina* var. *obesior* Koch *Syn.* 111 (1835); *Lepigonum marginatum* Koch in *Flora* xxi, 505 (1841).

Icones:—Smith *Eng. Bot.* t. 958, as *Arenaria marina*; *Svensk Bot.* t. 743, as *Alsine marina*; DC. *Icon.* t. 48, as *Arenaria marginata.*

*Camb. Brit. Fl.* iii. *Plate 21.* (*a*) Flowering shoot. (*b*) Seeds (enlarged). Norfolk (C. E. M.). (*c*) Flowering shoot. (*d*) Seed (enlarged). Somerset (E. W. H.). (*e*) Flowering shoot. (*f*) Seed (enlarged). Isle of Wight (E. W. H.).

Exsiccata:—Bourgeau (*Pl. d'Esp.*), 975; Fries, viii, 38, as *Lepigonum marinum*; Wirtgen, viii, 330, as *Lepigonum marginatum.*

Perennial, a larger plant than *S. salina.* *Shoot* glandular or eglandular. *Branches* prostrate or decumbent, more or less compressed, terete. *Stipules* smaller than in *S. salina* and *S. marginata* × *salina*, entire except sometimes in age. *Laminae* larger than in *S. salina.* *Inflorescence* rarely dichasial. *Pedicel* of the lower flowers markedly longer than the persistent calyx, sometimes about twice as long. *Flowers* about 1·2—1·5 cm. in diameter, appearing earlier than those of *S. salina*; mid-May to September. *Sepals* narrower than and a little shorter than the petals. *Petals* pale lilac with a white base, much paler in colour and markedly larger than those of *S. salina.* *Stamens* 10, obdiplostemonous. *Capsules* larger than in *S. salina* and *S. marginata* × *salina*, projecting considerably from the calyx, about 10—12 mm. long and broad, acute. *Seeds* broadly pyriform to suborbicular, compressed, usually rimmed, all surrounded by a membranous radially marked wing.

The *Arenaria rubra* var. *marina* L. includes both *Spergularia salina* and *S. marginata*, as seen particularly in Linnaeus's *Fl. Anglica* (1754). The *Arenaria media* L. *Sp. Pl.* (1762) does not refer to either of those species, but to *Spergula pentandra*, though the specimen of the Linnaean herbarium is *Spergularia marginata* and a specimen by Linnaeus at Stockholm is (*fide* Kindberg) *S. rupicola.*

We definitely reject the trivial names *media* and *marina* for this species and the last as *nomina confusa*, and take up the unequivocal names *salina* and *marginata.*

(*β*) subvar. **glandulosa** comb. nov.; *Buda media* var. *glandulosa* Druce in *Bot. Exch. Club Brit. Rep. for 1899*, i, p. 599 (1901)!

*Shoot* more or less strongly glandular.

Kent (Druce *loc. cit.*) and doubtless elsewhere.

Abundant on salt-marshes (especially in the general or mixed salt-marsh association), occasional on spray-washed rocks, rather rare on the drier edges of salt-marshes (where it sometimes grows side by side with *S. salina*); in nearly all the maritime counties of the British Islands, northwards to Orkney; unknown in inland localities.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; Africa; Asia; America.

*S. marginata* × *salina* (page 22).

## Tribe III. *SAGINEAE*

**Sagineae** Caruel in Ledebour's *Fl. Ital.* ix, 564 (1892) non Fenzl; *Sabulineae* Fenzl in Endlicher *Gen. Pl.* 963 (1836—1840).

For characters, see page 14.

British genera of *Sagineae*

Genus 4. **Sagina** (see below). *Sepals* *n*. *Petals* *n*. *Stamens* $n+n$ or *n*. *Stigmas* (and carpels) *n*. *Capsule* splitting by *n* valves. ($n=5$ or 4.)

Genus 5. **Alsine** (p. 32). *Sepals* *n*. *Petals* *n*. *Stamens* $n+n$ or *n*. *Stigmas* fewer than *n*, usually 3. *Capsule* dehiscing by as many valves as there are stigmas. ($n=5$ or 4.)

## Genus 4. Sagina

**Sagina** L. [*Gen. Pl.* 118 (1737)]; *Sp. Pl.* 128 (1753) et *Gen. Pl.* ed. 5, 62 (1754) partim, including *Spergula* (q.v.) partim; Presl *Fl. Sic.* 159 (1826); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 81 (1889).

Small or minute, perennial or annual herbs, often caespitose when perennial. *Primary rosettes* of leaves present and usually persistent. *Leaves* linear or subulate, subconnate at the base, entire or nearly so. *Flowering branches* arising from the axils of the rosette-leaves; the axillary shoots or buds (in the perennial species) often propagating the plants. *Inflorescence* 1—2-flowered or solitary. *Flowers* stalked, protandrous, *n*-merous ($n=4$ or 5), inodorous, often homogamous. *Petals* present or not; if present, white, entire, conspicuous or minute. *Stamens* $n+n$ or *n*. *Stigmas* *n*, antisepalous. *Capsule* with *n* carpels, carpels remaining entire after dehiscence, sepals erect or spreading in fruit. *Ovules* $\infty$ in each ovary. ($n=5$ or 4.)

The species of this genus are so very closely allied that it is impossible to subdivide the genus into distinct groups of any higher rank than series. No botanist now follows Linnaeus, Dumortier, and Reichenbach in placing the species in two genera; and we find it impossible to follow those who divide the genus into subgenera or even sections. We think too that the species of *Sagina* have been unduly multiplied by most modern botanists; and we do not hesitate to reduce several of these so-called species to varieties, others to subvarieties and *formae*, and still others to mere synonyms.

About 20 species; in all extra-tropical regions (and on mountains in the tropics) except Australasia.

British series of *Sagina*

Series i. **Nodosae** (see below). Perennial. *Inflorescence* a 2-flowered or 1-flowered terminal cyme. *Flowers* large (about 1 cm. in diameter), pentamerous. *Petals* about twice as long as the calyx. *Capsules* much longer than the calyx.

Series ii. **Subulatae** (p. 25). Perennial. *Inflorescence* 1-flowered, terminal or apparently lateral from the last node but one. *Pedicels* erect in flower, nodding after pollination, erect again in fruit. *Flowers* usually pentamerous, sometimes tetramerous, about 3—8 mm. in diameter. *Petals* about as long as the sepals. *Capsules* a little longer than or nearly twice as long as the calyx.

Series iii. **Procumbentes** (p. 29). Perennial. *Inflorescence* 1-flowered, terminal or apparently lateral from the last few nodes. *Flowers* minute (about 2·5—5·0 mm. in diameter), usually tetramerous, sometimes pentamerous. *Petals* absent or only about half as long as the sepals. *Capsules* about as long as the calyx.

Series iv. **Apetalae** (p. 30). Annual. *Barren shoots* absent. *Primary rosette* usually fugaceous. *Inflorescence* 1-flowered, terminal or apparently lateral from the last few nodes. *Flowers* minute (about 2—4 mm. in diameter). *Petals* absent or only about a third or a quarter as long as the sepals. *Capsules* about as long as the calyx.

### Series i. *Nodosae*

**Nodosae** nobis. For characters, see above. Only British species:—*S. nodosa*.

### 1. SAGINA NODOSA. Knotted Spurrey. Plate 22

*Alsine palustris foliis tenuissimus sive saxifraga palustris alsine folia* Goodyer in Gerard's *Herball* ed. 2, 568 (1633); *Alsine palustris foliis tenuissimus seu saxifraga palustris anglica* Ray *Syn.* ed. 3, 350 (1724).

**Sagina nodosa** Fenzl *Vers. Verbr. Alsin.* opp. p. 18 (1833); in Ledebour *Fl. Ross.* i, 340 (1842); Syme *Eng. Bot.* ii, 125 (1864); Rouy et Foucaud *Fl. France* iii, 294 (1896); *Spergula nodosa* L. *Sp. Pl.* 440 (1753)!; Smith *Fl. Brit.* 503 (1800)!.

Icones:—Smith *Eng. Bot.* t. 694, as *Spergula nodosa*; *Fl. Dan.* t. 96, as *Spergula nodosa*; Curtis *Fl. Lond.* i, 90, as *Spergula nodosa*; Reichenbach *Icon.* v, t. 203, fig. 4965, as *Spergella nodosa*.

*Camb. Brit. Fl.* iii. *Plate 22.* (*a*) Portion of plant. (*b*) Ovary (enlarged). Lancashire (A. W.). (*c*) Portion of plant. (*d*) Leaf (enlarged). (*e*) Ovary (enlarged). *c* to *e* = subvar. *moniliformis*; near Southport, Lancashire (J. A. W.).

Exsiccata:—Billot, 1833; Fellman, 39; v. Heurck et Martinis, vi, 253; Reichenbach, 496, as *Spergella nodosa*; Schultz (*Herb. Norm.*), i, 22; Tausch; Wirtgen, x, 563, as *Spergella nodosa*; xvii, 950, as *Sagina nodosa* var. *pubescens*; *Herb. Fl. Ingric.* i, 121.

Perennial, laxly caespitose. *Shoot* glabrous or more or less glandular-pubescent. *Primary rosettes* vernal or aestival, numerous, small. *Flowering branches* elongate, up to about 16 cm. long, leafy to the tip. *Leaves* mucronate, those of the flowering branches often fascicular owing to the growth of the axillary buds, or the axillary buds delayed in development and eventually falling to the ground and there germinating. *Pedicels* erect about 1 cm. long. *Flowers* protandrous about 1 cm. in diameter; July and August. *Petals* about twice as long as the sepals. *Stamens* 10. *Capsule* longer than the calyx. *Seeds* minutely tuberculate.

(*β*) subvar. **glandulosa** Rouy et Foucaud *Fl. France* iii, 295 (1896); *S. glandulosa* Besser *Prim. Fl. Galic.* i, 298 (1809); *S. nodosa* var. *pubescens* Mertens und Koch *Deutschl. Fl.* iii, 362 (1831); *S. nodosa* var. *glandulosa* Ascherson *Fl. Brandenb.* 97 (1860).

Icones:—Reichenbach *Icon.* v, t. 203, fig. 4965 *β*, as *Spergella nodosa* var. *glandulosa.*

*Shoot* more or less glandular.

With the eglandular form, as in Somerset, Derbyshire, Perthshire, western Inverness-shire, Orkney, etc.

Norway, Denmark, Germany, France, central Europe.

(*γ*) subvar. **moniliformis** comb. nov.; *Alsine nodosa* var. *moniliformis* Meyer *Chlor. Hanov.* 206 (1836); *S. nodosa* var. *moniliformis* Lange *Haandb. Danske Fl.* 317 (1856—59).

*Camb. Brit. Fl.* iii. *Plate 22, c—e.*

*Leaf-axils* with fascicles of small leaves, which ultimately fall off and take root.

For an interesting account of the vegetative propagation of this plant, see W. G. Travis in *Journ. Bot.* xlix, 270 (1911).

Devonshire, Hampshire, Norfolk, Berkshire, Oxfordshire, Lancashire, Merionethshire, Anglesey, co. Clare, co. Galway, co. Donegal, and doubtless elsewhere.

As the species.

In marshy places, chiefly on calcareous soils; in particular, in dune-marshes, fens, lowland transitional peat-moors, and wet calcareous grassland; rarely on wet siliceous grassland; scattered almost throughout the British Isles, but rather local.

Iceland, Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, Spain, Italy; North America.

### Series ii. *SUBULATAE*

**Subulatae** nobis. For characters, see page 24.

#### BRITISH SPECIES OF *Subulatae*

2. **S. subulata** (see below). *Shoot* more or less glandular-pubescent. *Leaves* distinctly mucronate. *Pedicels* about 1·5—3·0 cm. long. *Flowers* pentamerous, about 6—8 mm. in diameter.

3. **S. nivalis** (p. 27). *Shoot* glabrous. *Leaves* submucronate. *Pedicels* erect about 5 mm. long. *Flowers* pentamerous, about 3 mm. in diameter.

4. **S. saginoïdes** (p. 27). *Shoot* glabrous. *Leaves* submucronate. *Pedicels* about 1·5—2·0 cm. long. *Flowers* pentamerous or tetramerous, about 4 mm. in diameter.

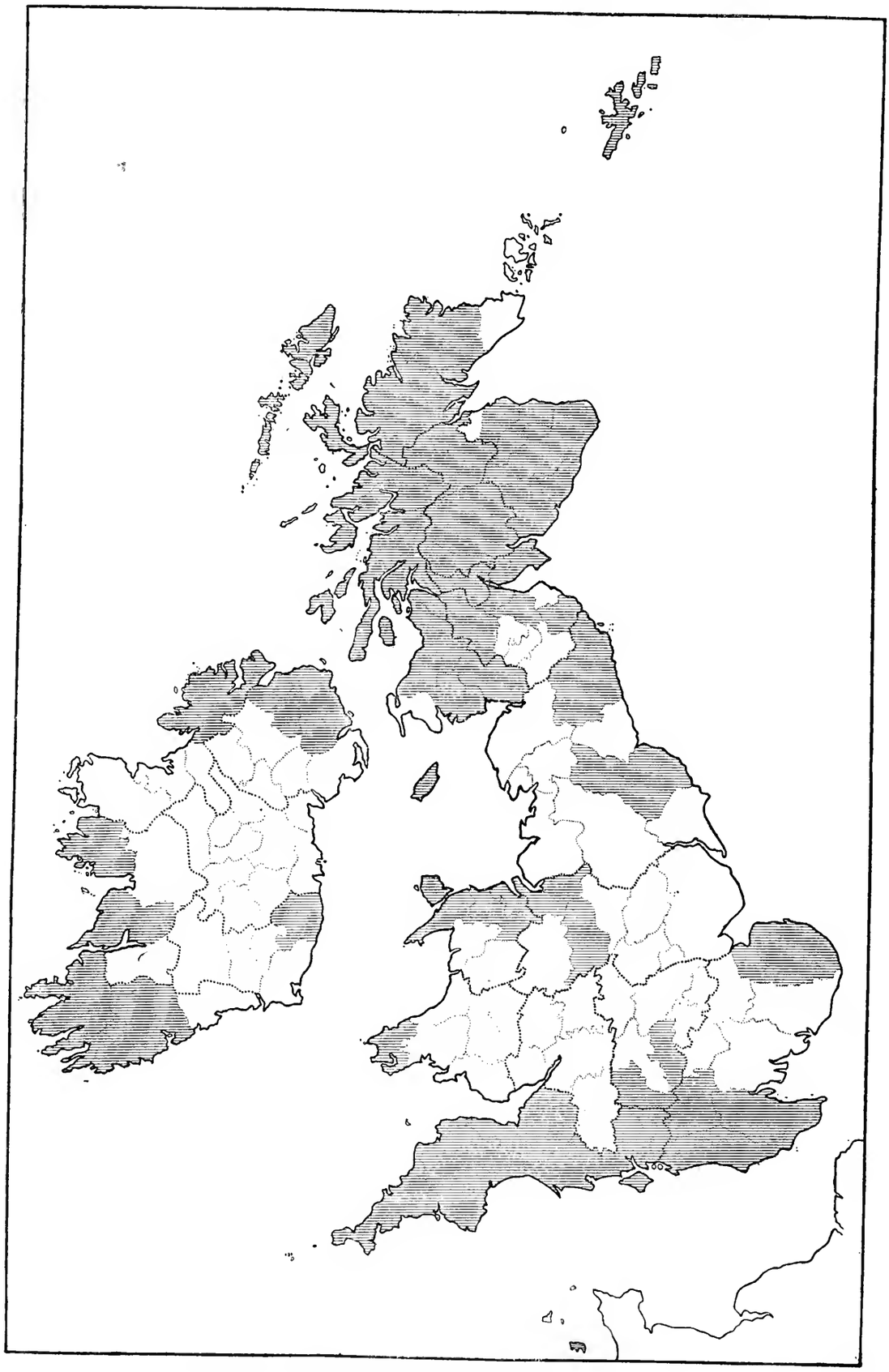
## 2. SAGINA SUBULATA. Plate 23

*Saxifraga graminea pusilla foliis brevioribus crassioribus et succulentioribus* Ray *Syn.* 146 (1690); ed. 3, 345 (1724).

**Sagina subulata** C. B. Presl *Fl. Sic.* i, 158 (1826); Syme *Eng. Bot.* ii, 122 (1864); Rouy *Fl. France* iii, 293 (1896); *Sagina procumbens* var. *β* L. *Sp. Pl.* 128 (1753)!; *Spergula laricina* Lightfoot *Fl. Scot.* 244 (1777) non L.; *Spergula subulata* Swartz in *Kongl. Vet. Acad. Handl.* Stockholm x, 45, t. 1, fig. 3 (1789); Smith *Fl. Brit.* 505 (1800)!

Icones:—Smith *Eng. Bot.* t. 1082, as *Spergula subulata*; Curtis *Fl. Lond.* i, 89, as *Spergula saginoïdes*; Reichenbach *Icon.* v, t. 202, fig. 4963, as *Spergella subulata.*

*Camb. Brit. Fl.* iii. *Plate 23.* (*a*) Plant in flower. (*b*) Plant in fruit. (*c*) Leaves (enlarged). (*d*) Flower-bud (enlarged). (*e*) Flowers, from above and from below (enlarged). (*f*) Ovary (enlarged). *a*—*f* = var. *minor.* Aberdeenshire (E. S. M.). (*g*) Flowering and fruiting branches (enlarged). (*h*) Leaves (enlarged). (*i*) Flower (enlarged). (*j*) Capsule and persistent calyx (enlarged). *g*—*j* = var. *major.* Jersey (E. W. H.).



Map 10. Distribution of *S. subulata* in the British Islands

Exsiccata :—Billot, 1134; Fries, iv, 56; E. et A. Huet du Pavillon, 293; Porta et Rigo (*Iter 1 Ital.*); Reichenbach, 1793, as *Spergella subulata*; Todaro, 1290, as *Spergula subulata.*

Perennial. *Shoot* rather laxly caespitose, up to about 12 or 13 cm. high. *Primary rosettes* small, numerous, vernal and autumnal, with leaves all pointing upwards. *Leaves* often minutely ciliate, often glandular, somewhat acuminate, distinctly mucronate. *Pedicels* longer than in the other species, up to about 3 cm. long. *Flowers* pentamerous, about 6—8 mm. in diameter. *Sepals* subacute, usually glandular. *Petals* a little longer than the sepals, either narrowly elliptical and rather acute or broadly oboval and obtuse, not or scarcely overlapping. *Stamens* 10. *Capsules* a little longer than the persistent calyx, with appressed sepals. *Seeds* minutely punctate.

(*a*) **S. subulata** var. **major** Rouy et Foucaud *Fl. France* iii, 294 (1896).

Icones:—*Camb. Brit. Fl.* iii. *Plate 23. g—j.*

More robust and larger than var. *minor*. *Petals* broadly obovate, obtuse, scarcely overlapping. *Capsules* about twice the size of those of var. *minor*.

Jersey, and perhaps elsewhere.

Also recorded for France.

(*b*) **S. subulata** var. **minor** nobis; *S. subulata* Rouy et Foucaud *loc. cit.*, excl. var. *major* p. 294.

Icones:—*Camb. Brit. Fl.* iii. *Plate 23. a—f.*

More densely tufted but smaller than var. *major*. *Petals* narrowly elliptical, rather acute, not contiguous. *Capsules* a little shorter than the persistent calyx, about 3 mm. long and 2 broad.

Probably this is a common form of the species, as it occurs in Jersey and Forfarshire.

Dry sandy or siliceous grassland and rocky places; local but widespread, ranging from Jersey to Zetland and from western Galway to Norfolk, ascending to 610 m. in Perthshire.

Faeröes, Iceland, southern Scandinavia, Denmark, Germany, Holland, France, central Europe, Russia, southern Europe.

## 3. SAGINA NIVALIS. Plate 24

**Sagina nivalis** Fries *Fl. Suec. Mont.* iii, 31 (1842)! excl. syn. Vahl; Watson in *Journ. Bot.* i, 355 (1863); Syme *Eng. Bot.* ii, 124 (1864); *Spergula saginoïdes* var. *nivalis* Lindblom in *Physiogr. Sällsk. Tidskr.* 328 (1838); in *Flora* xxiv, 587 (1841); *S. intermedia* Fenzl in Ledebour *Fl. Ross.* i, 339 (1842).

Icones:—Syme *Eng. Bot.* ii, t. 250 bis (very schematic); *Fl. Dan.* t. 2961.

*Camb. Brit. Fl.* iii. *Plate 24.* (*a*, *b*, *c*) Plants in fruit. (*d*) Portion of shoot (enlarged). (*e*) Persistent calyx enclosing capsule (enlarged). (*f*) Capsule (with persistent calyx) dehiscing. *a* from Perthshire (C. P. H.). *b—f* from Perthshire (C. E. M.).

Exsiccata:—Fries, xii, 51.

Perennial, densely tufted. *Shoot* glabrous. *Leaves* very small, up to about 3 mm. long, submucronate. *Flowering branches* very short, numerous, rigid. *Pedicels* short, erect, about 5 mm. long. *Flowers* pentamerous, about 3 mm. in diameter; July. *Sepals* broad, obtuse. *Petals* about as long as the sepals. *Capsules* rather longer than the calyx, with erect sepals. *Seeds* rugose.

Very rare; in crevices of rocks on the summits of mountains; only certainly known from Perthshire, up to about 1210 m., but doubtful records exist for Dumbartonshire or Argyllshire, Forfarshire, and the Isle of Skye.

Arctic Europe (including the Faeröes and Iceland), and Asia; Greenland. Not known in central Europe.

## 4. SAGINA SAGINOÏDES. Plates 25, 26

**Sagina saginoïdes** Dalla Torre *Anleit. Beob. Alpenpfl.* 75 in Hartinger's *Atlas der Alpenpfl.* (1882) incl. *S. macrocarpa*; Britton in *Mem. Torr. Club* v, 151 (1894); Moss in *Journ. Bot.* lii, 60 (1914); *Spergula saginoïdes* L. *Sp. Pl.* 441 (1753)!; Smith *Fl. Brit.* 504 (1804)!; *Alsine saginoïdes* Crantz *Inst.* ii, 408 (1766); *Sagina linnaei* C. B. Presl *Rel. Haenk.* ii, 14 (1831); *S. saxatilis* Wimmer *Fl. Schles.* 75 (1841); Syme *Eng. Bot.* ii, 122 (1864).

Perennial. *Root* slender. *Shoot* glabrous, eglandular. *Primary rosettes* with leaves up to about 1·5—2·5 cm. long, hibernal. *Flowering branches* procumbent or ascending, often producing barren rosettes (as in *S. procumbens*) in the axils of the leaves, these secondary rosettes ultimately often separating from the plant and propagating it. *Leaves* submucronate. *Pedicels* about 1—2 cm. long, erect when in flower, bending over at the top after flowering, erect again when in fruit. *Flowers* usually pentamerous, sometimes tetramerous, about 4 mm. in diameter; June to late August or early September. *Sepals* a little shorter than the petals. *Petals* not contiguous or a little

overlapping. *Stamens* $n+n$. *Capsule* from a little longer than the calyx to almost twice this length, with sepals erect or more rarely spreading in fruit. *Seeds* minutely punctate.

*S. saginoïdes* may be distinguished from *S. procumbens* by its rather more robust habit, its rather longer leaves which are scarcely mucronate, its usually longer pedicels, its fewer pedicels to each flowering branch, its usually erect or suberect fruiting sepals, its more frequently pentamerous flowers, its larger and more conspicuous petals, its larger capsules, and by its much greater abundance in sub-Alpine and Alpine habitats. From *S. subulata* it is known by its being glabrous and eglandular, by the absence of the marked mucronation of the apex of the leaves, and by the smaller flowers and capsules.

(*a*) **S. saginoïdes** var. **macrocarpa** Moss in *Journ. Bot.* lii, 60 (1914); *Spergella macrocarpa* Reichenbach *Icon.* v, 26, fig. 4963 *b* (1841); *Sagina macrocarpa* Maly *Enum. Pl. Austr.* 293 (1848); *S. saxatilis* var. *macrocarpa* Hausmann *Fl. Tirol.* 133 (1854); *S. linnaei* var. *macrocarpa* Beck *Fl. Nied.-Öst.* 358 (1890).

Icones :—Smith *Eng. Bot.* t. 2105, as *Spergula saginoïdes*; *Fl. Dan.* t. 1577, as *Spergula saginoïdes*; *Svensk Bot.* t. 765, as *Spergula saginoïdes*; Reichenbach *Icon.* v, t. 202, fig. 4963 *b*, as *Spergella macrocarpa.*

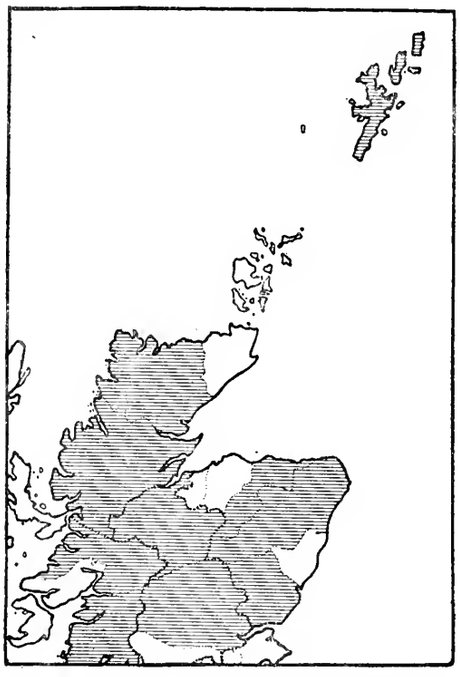
*Camb. Brit. Fl.* iii. *Plate 25.* (*a*) Whole plant. (*b*) Flower (enlarged). (*c*) Ovary (enlarged). (*d*) Capsules. (*e*) Capsules (enlarged). Perthshire (E. S. M.).

Exsiccata :—Billot, 1423 (partim), as *Sagina linnaei*; Fellman, 42, as *Arenaria biflora* (corrected later to *S. saxatilis*); Fries, ix, 40, as *S. saxatilis.*

Rather more robust than var. *typica*. *Pedicels* rather stouter. *Sepals* broader. *Petals* narrower. *Capsules* longer, about 1·3—1·9 times as long as the calyx.

This appears to be the commoner form of the species throughout its whole area of distribution.

(*b*) **S. saginoïdes** var. **typica** Moss *loc. cit.*; *Spergella saginoïdes* Reichenbach *Icon.* v, 26, fig. 4962 (1841)!; *S. linnaei* var. *typica* Beck *Fl. Nied.-Öst.* 358 (1890); × *S. normanniana* Lagerheim in *Kgl. Norske Vidensk. Selsk. Skr.* for 1898, no. 1, 4 (1898); *S. glabra* var. *scotica* Druce in *New Phyt.* 325 (1911)!, descr. emend.; *S. scotica* Druce in *Bot. Exch. Club Brit. for 1911*, 14 (1912)!; *S. procumbens* × *saginoïdes* Ostenfeld in *New Phyt.* 117 (1912)!, ?excl. syn. *Brügger*; Lindman in *Bot. Notiser* 267, fig. 1 *b* et fig. 2 *b—g* et fig. 3 *b* et fig. 4 *c—e* (1913)!, ?excl. syn. Brügger.



Map 11. *S. saginoïdes* is known to occur in the counties which are shaded

Icones :—Reichenbach *Icon.* v, t. 202, fig. 4962, as *Spergella saginoïdes.*

*Camb. Brit. Fl.* iii. *Plate 26.* (*a*) Portion of plant. (*b*) Leaf (enlarged). (*c*) Flowers (enlarged). (*d*) Petal (enlarged). (*e*) Ovaries (enlarged). (*f*) Capsules. (*g*) Capsules (enlarged). Perthshire (C. E. M.).

Exsiccata :—Billot, 1423 (partim), as *S. linnaei*; Reichenbach, 1095, as *Spergella saginoïdes*; Schultz et Winter, 21, as *S. linnaei.*

Less robust and more straggling than var. *macrocarpa*. *Barren rosettes* more numerous, with shorter leaves (up to about 1·8 cm. in length). *Pedicels* more slender. *Flowers* more frequently tetramerous. *Sepals* narrower, erect or spreading in fruit. *Petals* actually smaller, but larger relatively to the size of the sepals. *Capsules* shorter, about 1·1—1·3 times as long as the calyx.

This variety appears to have been first definitely noticed as a British plant by the members of the International Phytogeographical Excursion, on Ben Lawers, Perthshire, in August, 1911; and it has since been the subject of considerable discussion. Ostenfeld (*loc. cit.*) and Lindman (*loc. cit.*) regard the plant as a hybrid of *S. procumbens* and *S. saginoïdes*. However we find no real evidence to support this hypothesis; and against the supposition it has to be remembered that the plant is very uniform in its characters over a very wide area of distribution, and that (in this country, at least) it often exists apart from the alleged parents. There is no evidence that its pollen or ovules are abortive, or that any factorial segregation occurs. No doubt the plant is distinct from var. *macrocarpa*; but its distinctive characters are too slight and elusive to permit of our regarding it as a species.

The variety is very widely distributed.

In Alpine situations, especially by stream-sides, springs, and swamps, more rarely on sub-Alpine grassland; from Argyllshire, Perthshire, and Forfarshire northwards to Zetland; unknown in England, Wales, and Ireland.

Iceland, Scandinavia, mountains of central Europe (Germany, France, Switzerland (ascending to 2550 m.), Austria-Hungary), northern and Arctic Russia, mountains of southern Europe; Asia; North America (including Greenland).

Series iii. *PROCUMBENTES*

**Procumbentes** nobis. For characters, see p. 24.

BRITISH SPECIES OF *Procumbentes*

[**S. boydi** (see below). Very densely tufted. *Internodes* very short. *Leaves* crowded, not mucronate. *Pedicels* about 1 mm. long. *Capsule* globose, with sepals more or less erect.]

5. **S. procumbens** (see below). Laxly tufted. *Leaves* mucronate. *Pedicels* about 1—2 cm. long. *Capsule* ovoid, with spreading sepals.

## [SAGINA BOYDI. Plate 27]

**Sagina boydi**[1] White in *Trans. Bot. Soc. Edinb.* xvii, 33 (1887); in *Journ. Bot.* xxx, 227 (1892).

Icones :—*Journ. Bot.* xxx, t. 326 B.

*Camb. Brit. Fl.* iii. *Plate 27.* (*a*) Portions of a single tuft. (*b*) Leaves (enlarged). (*c*) Flowers (enlarged). Cambridge Botanic Garden: plant originally sent there by Mr Boyd (R. I. L.).

Perennial, very densely tufted. *Shoot* glabrous. *Internodes* very short. *Leaves* crowded, recurved. *Pedicels* rigid, about 1 mm. long. *Flowers* pentamerous or tetramerous, about 3—5 mm. in diameter. *Petals* absent. *Stigmas* very short. *Capsule* globose, not longer than the calyx, with sepals more or less erect. *Seeds* minute.

Only once found (probably in Braemar, Aberdeenshire), by Mr W. B. Boyd, in 1878. It "was collected among a number of other specimens, not attracting notice until the collections were planted out on Mr Boyd's return home. He does not remember gathering it; and the exact locality is therefore doubtful; but his impression is that it was obtained upon Ben A'an, a hill in the deer-forest of Invercauld, somewhat difficult of access" (*Journ. Bot.* xxx, 226 (1892)).

Aberdeenshire. Not known elsewhere.

## 5. SAGINA PROCUMBENS. Pearlwort. Plate 28

*Saxifraga anglicana* Johnson *Kent* 2 (1629); *Alsinella muscosa flore repens* Dillenius *Cat. Giss.* 81 (1719); Ray *Syn.* ed. 3, 345 (1724).

**Sagina procumbens** L. *Sp. Pl.* 128 (1753) excl. vars.; Smith *Fl. Brit.* 199 (1800)!; Syme *Eng. Bot.* ii, 120 (1864); Rouy et Foucaud *Fl. France* iii, 285 (1896).

Icones :—Smith *Eng. Fl.* t. 880; Curtis *Fl. Lond.* i, 35; Reichenbach *Icon.* v, t. 201, fig. 4959.

*Camb. Brit. Fl.* iii. *Plate 28.* (*a*) Whole plant (a shade form). (*b*) Leaves (the ciliate form) (enlarged). *a* from Perthshire (C. E. M.). *b* from W. R. Yorkshire, sent as var. *spinosa* (J. N.).

Exsiccata :—Billot, 2633, et 2633 bis; Bourgeau (*Pl. d'Esp.*), 1327; Fries, xv, 45, as *S. procumbens* var. *fontana*; v. Heurck, i, 40, as *S. procumbens* var. *intermedia*; Huter (*Iter Hisp.*), 987; *Herb. Fl. Ingric.* i, 120.

Perennial, laxly tufted. *Shoot* glabrous or almost glabrous. *Primary rosettes* stronger and more vigorous than in the other species, with leaves up to about 3 cm. long. *Flowering branches* eventually decumbent, with leaves about half as long as those of the central rosette, some of the axillary buds giving rise to secondary rosettes which lie on the ground and take root and then become detached from the parent plant. *Leaves* glabrous or minutely ciliate, mucronate. *Pedicels* from 1—2 cm. long. *Flowers* usually tetramerous, rarely pentamerous, appearing almost all the year round. *Petals* absent, rudimentary, or minute; obtuse, and only about a third or a quarter as long as the sepals. *Stamens n* or *2n*. *Capsules* about as long as the calyx, with spreading sepals. *Seeds* minutely punctate.

The apetalous form has been named *S. procumbens* var. *apetala* (Fenzl in Ledebour *Fl. Ross.* i, 339 (1842)), and the form with petals *S. procumbens* var. *corallina* (Fenzl *loc. cit.*). A form with double flowers occasionally occurs (see *Journ. Bot.* l, 288 (1912)), and was figured by Baxter (*Brit. Phaen. Bot.* iii, t. 199 (1837)). The form with leaves minutely ciliate was named var. *spinosa* [*sic*] by Gibson.

Rather damp places and more rarely in wet places on siliceous grassland, walls, garden-paths, lawns, and waste places. Very common, throughout the British Islands, ascending to about 1000 m. in Perthshire (*fide* White *Fl. Perthshire* 86 (1898)).

Faeröes, Iceland, Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (recorded up to 2600 m.); Russia, southern Europe; northern Africa; Asia; America (including Greenland).

[1] After Mr W. B. Boyd.

Series iv. *APETALAE*

**Apetalae** nobis. For characters, see p. 24.

BRITISH SPECIES OF *Apetalae*

6. **S. maritima** (see below). *Shoot* usually glabrous. *Leaves* usually not mucronate. *Capsule* stouter than in *S. apetala.*

7. **S. apetala** (see below). *Shoot* usually more or less ciliolate or glandular. *Leaves* mucronate. *Capsules* small, narrow, up to about 3 mm. long and 2 broad, with sepals either erect or suberect or spreading.

## 6. SAGINA MARITIMA. Plate 29

**Sagina maritima** G. Don *Herb. Brit.* fasc. vii, no. 155 (1806)!, cum descr.; Smith *Eng. Bot.* no. 2195 (1810); Syme *Eng. Bot.* ii, 117 (1864); Rouy *Fl. France* iii, 289 (1896); *S. erecta* Müller in *Fl. Dan.* fasc. xv, p. 2, t. 845 (1782) nomen abortivum, non Linn.[1]; *S. stricta* Fries *Fl. Suec.* 47 (1817)!

Icones:—Smith *Eng. Bot.* t. 2195; Graves and Hooker in Curtis's *Fl. Lond.* ed. 2, v, t. 115; *Fl. Dan.* t. 845, as *S. erecta*; Reichenbach *Icon.* v, t. 201, fig. 4960; Jordan *Observ.* frag. 3, t. 3, fig. A, as *S. maritima*, fig. B, as *S. densa*, et fig. C, as *S. debilis.* (Jordan's figures appear to us to represent three states or *formae* of the species.)

*Camb. Brit. Fl.* iii. *Plate 29.* (*a*) Whole plant. Sussex (T. H.). (*b*) Whole plant. (*c*) Rosette-leaves (one enlarged). (*d*) Portion of branch (enlarged). Jersey (E. W. H.). (*e*) Whole plant. (*f*) Flowers (enlarged). Somerset (E. W. H.).

Exsiccata:—Billot, 2424; Don, vii, 155; Fries, i, 43, as *S. stricta*; x, 42, as *S. stricta* var. *maritima*; Reichenbach, 1296; Schultz (*Fl. Gall. et Germ.*), 237 bis, as *S. stricta.*

Annual. *Shoot* usually glabrous and eglandular. *Stem* erect or decumbent. *Primary rosette* usually soon withering. *Leaves* obtuse, usually not mucronate. *Pedicels* rigid, 1—2 cm. long. *Flowers* tetramerous; May to August. *Sepals* about half as broad as long, obtuse, with a narrow scarious margin. *Petals* absent or minute. *Stamens* 4, antisepalous. *Capsules* erect, larger than in *S. apetala* and *S. procumbens*, about 4 mm. long and 3·0—3·5 broad, persistent sepals usually erect. *Seeds* slightly rugose; June to September.

A plant intermediate between *S. apetala* and *S. maritima* was pointed out to us in June, 1914, by Mr and Mrs Corstorphine on calcareous coastal cliffs in Forfarshire. It has the large capsules and fruiting sepals of *S. maritima*, but is glandular-hairy and has apiculate leaves as in *S. apetala.* If not a hybrid, the plant suggests the desirability of uniting the closely allied species *S. apetala* and *S. maritima.*

Drier parts of salt-marshes, spray-washed rocks and cliffs, and waste places near the sea, from the Channel Isles, Cornwall, and Kent northwards to Zetland; in nearly all the maritime counties of Ireland; rare on mountains, as on Ben Nevis and on the Cairngorms in Scotland.

Scandinavia, Denmark, Germany, Holland, Belgium, France, southern Europe; northern Africa.

## 7. SAGINA APETALA. Plate 30

*Saxifraga anglicana annua alsine folio* Plot *Nat. Hist. Oxfordsh.* 146, t. 9, fig. 7 (1677); Ray *Syn.* ed. 3, 345 (1724).

**Sagina apetala** Arduino *Animad. Bot. Spec.* ii, p. xxii, t. 8, fig. 1 (1763)!; L. *Mantissa* ii, 559 (1771); Smith *Fl. Brit.* 199 (1800)!; Rouy et Foucaud *Fl. France* ii, 287 (1896).

Icones:—Graves and Hooker in *Fl. Lond.* ed. 2, v, t. 1; *Fl. Dan.* t. 2102; *Sv. Bot.* t. 562, fig. 1, as *S. stricta.*

Exsiccata:—Don, 156, as *S. apetala*; Reichenbach, 68, as *S. apetala*; Schultz (*Fl. Gall. et Germ.*), 1229, as *S. apetala.*

Annual. *Shoot* glabrous or more or less glandular-hairy. *Primary rosette* small, with leaves up to about 2 cm. long and about 1 mm. broad. *Flowering branches* diffuse, ascending, or erect. *Leaves* glabrous or more or less glandular-ciliate, especially towards the base, mucronate. *Pedicels* 2 mm. to 2 cm. in length. *Flowers* tetramerous; May—July. *Sepals* obtuse or the 2 outer ones usually mucronate. *Petals* very minute, lanceolate, acute, or absent. *Stamens* 4. *Capsule* about as long as the persistent calyx, with the sepals ultimately either divaricate or appressed.

[1] *S. erecta* L. (cf. p. 42) was not removed to *Moenchia* until some years later: hence the name *S. erecta* Müller was still-born.

Numerous states of this variable species have been described. We here recognise the following three varieties, though we are not fully convinced that they are deserving of any higher rank than that of *formae* or subvarieties.

(*a*) **S. apetala** var. **communis** var. nov.; *S. apetala* Jordan *Observ.* fragm. i, 27, t. 3 B (1846); Syme *Eng. Bot.* ii, 118 (1864).

Icones :—Smith *Eng. Bot.* t. 881, as *S. apetala.*

Exsiccata :—Billot, 516, 516 bis, 516 ter, as *S. apetala*; Fries, xii, 54, as *S. apetala*; Schultz (*Herb. Norm.*), 832, 832 bis, as *S. apetala.*

*Sepals* divaricate in fruit. *Petals* usually present, minute.

(*b*) **S. apetala** var. **ciliata** Garcke *Deutschl. Fl.* ed. 13, 65 (1878); *S. ciliata* Fries *Fl. Suec.* 47 (1814); Babington in *Ann. Mag. Nat. Hist.* ser. 2, i, 153 (1848); *Bot. Gaz.* i, 176 (1849); Syme *Eng. Bot.* ii, 119 (1864); *S. depressa* F. Schultz *Prodr. Fl. Starg. Suppl.* 10 (1819); *S. patula* Jordan *Obs.* fragm. i, 25, t. 3 A (1846)!; *S. filicaulis* Jordan *Obs.* fragm. vii, 16 (1849); *S. ambigua* Lloyd *Fl. l'Ouest Fr.* 74 (1854); *S. apetala* subsp. *ciliata* Rouy et Foucaud *Fl. France* iii, 288 (1896).

Icones :—Reichenbach *Icon.* v, t. 200, fig. 4956, as *S. ciliata*; fig. 4957, as *S. depressa*; fig. 4958, as *S. apetala*; Syme *Eng. Bot.* ii, t. 247, as *S. ciliata*; *Sv. Bot.* t. 562, fig. 2, as *S. ciliata.*

*Camb. Brit. Fl.* iii. *Plate 30.* (*a, b*) Whole plants. (*c*) Leaves of primary rosette (enlarged). (*d*) Portion of flowering branch (enlarged). (*e*) Flower (enlarged). Worcestershire (*b*, R. F. T., sent as *S. apetala* × *reuteri*). *a*, *c* and *d* from Jersey (E. W. H.).

Exsiccata :—Billot, 517, as *S. patula*; Crépin, 1009, as *S. ciliata*; Fries, i, 42, as *S. ciliata*; v. Heurck, ii, 52, as *S. patula*; Schultz, v, 438, et vii, 438 ter, as *S. depressa*; v, 438 bis, et ix, 438 ter, as *S. depressa* var. *glandulosa*; Thielens et Devos, i, 33, as *S. patula*; Wirtgen, ix, 447, as *S. patula*; xvii, 949, as *S. ciliata.*

*Sepals* remaining more or less closely appressed to the capsule. *Petals* usually absent.

Beneken (in *Bot. Zeit.* iii, 721 (1845)) maintained that the two preceding varieties are brought about by habitat-conditions. His views were combated by Babington (in *Bot. Gaz.* i, 174—177 (1849)), and supported by Henfrey (*ibid.* ii, 182 (1850)).

Babington (*loc. cit.*) pointed out that Fries' name *S. ciliata* is an unfortunate one, for the presence or absence of a fringe of hairs upon the lower part of the leaves has proved to be far too inconstant to be depended on. Schultz's name *S. depressa* and Jordan's name *S. patula* are both also inapplicable to some states of the plant. The trouble here is that the characters which have called forth these names are not fixed. We should however hesitate in this case to trace the cause of the variation to Mendelian segregation. It seems unreasonable, when the flowers are so minute as in *S. apetala*, to assume, in the absence of experimental knowledge, the existence of hybrids and consequent factorial segregation. If an assumption must be made, it seems more reasonable to suppose that the flowers are self-pollinated, and that the variations are, as Benekin and Henfrey believed, largely due to the conditions of the habitat. Both var. *communis* and var. *ciliata* are widely distributed.

(*c*) **S. apetala** var. **reuteri** H. and J. Groves in Babington's *Manual* ed. 9, 58 (1904); *S. reuteri* Boissier *Diagn. Pl. Or. Nov.* ser. 2, fasc. i, 82 (1883); *S. reuteri* var. *glabra* Ingham and Wheldon in *Journ. Bot.* xlvi, 111 (1908)!

Icones :—Willkomm *Icon. et Descr.* i, t. 73, fig. A (1852), as *S. reuteri.*

*Camb. Brit. Fl.* iii. *Plate 30.* (*f*) Whole plant. (*g, h*) Fruits (enlarged). Worcestershire (S. H. B.).

A minute ephemeral form. *Primary rosette* small, with leaves up to about 6 or 7 mm. long. *Pedicels* very short, up to about 3—4 mm. long. *Capsule* small, up to about 2 mm. long and rather narrower than in the preceding varieties, with usually erect sepals, carpels emarginate-truncate after dehiscence.

Mr R. F. Towndrow (*Journ. Bot.* xxxiv, 367 (1896)) believes that this plant was introduced from Spain with the ballast employed to make the platform of the railway stations at Worcester about the year 1858.

Mr F. N. Williams (see *Journ. Bot.* xlvi, 110 (1908)) states that he has received so many specimens of the plant from the north of England, and from inland localities as to preclude the idea of its having been imported from Spain. He adds:—"I am quite prepared to reverse the early view of the habitat of this plant, and now hold that it is a casual or alien in its original and only station 'near Madrid,' and a native of more northern countries."

Possibly the limited distribution of the plant is more apparent than real, and due to its having been passed over as a dwarf state of *S. apetala.*

The var. *reuteri* has been recorded for Devonshire, Hampshire, Sussex, Kent, Surrey, Herefordshire, Worcestershire, Cheshire, Lancashire, Yorkshire, and Pembrokeshire; but we do not venture to vouch for the correctness of this distribution.

Out of Great Britain, the var. *reuteri* has only been definitely recorded for Spain (near Madrid).

*S. apetala* occurs in waste places on dry light soils, on grassy heaths, in arable land, and on the mortar of walls; common throughout the lowlands of England, local to rare in Wales and Scotland; northwards to Zetland, and throughout Ireland.

Southern Sweden, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; northern Africa; Asia; America.

## Genus 5. Alsine

**Alsine** L. *Sp. Pl.* ed. 2, 389 (1762) [non ed. 1, 272 (1753)] emend.; Crantz *Inst.* ii, 404 (1766) emend.; Gaertner *Fruct.* ii, 223, t. 129 (1791); Wahlenberg *Fl. Lapp.* 127 (1812); Fenzl in Endlicher *Gen. Pl.* 964 (1836—1840); Syme *Eng. Bot.* ii, 107 (1864); Pax in Engler und Prantl *Pflanzenfam.* iii, 1 b, 82 (1889); Williams in *Journ. Bot.* xxxiv, 427 (1896); Rouy et Foucaud *Fl. France* iii, 261 (1896); Moss in *Journ. Bot.* lii, 200 (1914); non Scopoli (1799) nec Hiern (1899) nec Schinz und Keller (1906); *Minuartia* [L. *Sp. Pl.* 89 (1753) emend.] Hiern in *Journ. Bot.* xxxvii, 320 (1899); H. and J. Groves in Babington's *Man.* ed. 9, 51 (1904); Schinz und Keller *Fl. Schweiz* ed. 3, 200 (1909); non aliorum.

Small herbaceous perennials and annuals differing from *Sagina* in the oligomerous *gynoecium* and from *Arenaria* in the capsules dehiscing by the same number of teeth as there are stigmas.

Our views on the thorny subject of the nomenclature of the genus *Alsine* were published in the *Journal of Botany* for 1914 (pp. 196—201), and are here summarised.

In the first edition of the *Species Plantarum* (1753) of Linnaeus, there are two species of *Alsine*, *Al. media* L. and *Al. segetalis* L.

Scopoli (1799) took the first of these as the type of his *Alsine*; but as *Al. media* L. is now universally recognised as a *Stellaria*, the genus *Alsine* Scop. disappears.

Hiern (1899) took the second of the above species, *Al. segetalis*, as the type of his *Alsine*. Sometimes that species is placed in *Spergularia* which is now a *nomen conservatum*; and thus *Alsine* Hiern is obsolete. By other authorities, the species is placed in *Delia*; and hence *Delia*, judging by priority alone, would become *Alsine* L. emend. Schinz and Keller.

In the second edition of the *Spec. Plant.* (i, 1762), Linnaeus added a third species of *Alsine*, namely, *Al. mucronata* L.

Gaertner (1799) took this third species as the type of his *Alsine*, and was followed by Wahlenberg and almost all other botanists. The name *Alsine*, as thus defined, is consequently established firmly in botanical literature; and, on this ground, it is here suggested that the name be placed on the list of *nomina utique conservanda generum*.

About 60 species; cosmopolitan, especially cold and temperate regions.

### British subgenera of *Alsine*

Subgenus I. **Eu-Alsine** (see below). Perennial or annual. *Leaves* linear. *Flowers* monoclinous. *Disc* small. *Ovary* longer than broad. *Seeds* many, small.

Subgenus II. **Cherleria** (p. 36). Perennial. *Leaves* broad. *Flowers* often monoclinous, hemi-dioecious. *Disc* with 5, large, linear-oblong glands. *Stigmas* 3—5, less than half as long as the ovary. *Ovary* broadly oval. *Seeds* few, small.

Subgenus III. **Honckenia** (p. 37). Perennial. *Leaves* broad, succulent. *Flowers* hemi-dioecious. *Disc* large. *Stigmas* 3—5, very short. *Capsule* subglobose, few-seeded. *Seeds* large.

### Subgenus 1. *EU-ALSINE*

**Eu-Alsine** nobis.; *Alsinantheae* Fenzl in Endlicher *Gen. Pl.* 965 (1836—1840) as a section, incl. *Tryphane* (p. 965) et *Sabulineae* (p. 964).

For characters, see above.

### British species of *Eu-Alsine*

1. **Al. stricta** (p. 33). Perennial. *Leaves* linear. *Flowering branches* with elongate internodes. *Petals* as long as the sepals. *Stigmas* 3, a third as long as the ovary. *Ovary* broadly elliptical.

2. **Al. verna** (see below). Perennial. *Leaves* linear-subulate. *Flowering branches* with variable internodes. *Petals* longer than the sepals. *Stigmas* 3, nearly as long as the ovary. *Ovary* narrowly and bluntly oval.

3. **Al. rubella** (p. 34). Perennial. *Leaves* linear, obtuse, very small. *Flowering branches* with short internodes. *Petals* about as long as the sepals. *Stigmas* 3—4. *Ovary* broadly oval.

4. **Al. tenuifolia** (p. 35). Annual. *Leaves* linear-subulate. *Internodes* elongate. *Petals* much shorter than the sepals. *Stigmas* 3—4. *Ovary* narrowly ovate.

## 1. ALSINE STRICTA. Plate 31

**Alsine stricta** Wahlenberg *Fl. Lapp.* 127 (1812); Rouy et Foucaud *Fl. France* iii, 265 (1896); *Spergula stricta* Swartz in *Kongl. Vet. Acad. Handl.* Stockh. xx, 235 (1799); *Arenaria uliginosa* [Schleicher ex] DC. *Fl. France* iv, 786 (1805)!; W. J. Hooker in *Eng. Bot. Suppl.* no. 2890 (1844); *Alsine uliginosa* Syme *Eng. Bot.* ii, 115 (1864); *Minuartia stricta* Hiern in *Journ. Bot.* xxxvii, 320 (1899); non *Arenaria stricta* Michaux *Fl. Bor. Am.* i, 274 (1803); *Arenaria lapponica* Sprengel *Syst. Veg.* ii, 402 (1825).

Icones :—DC. *Icon. Pl. Gall. Rar.* t. 46, as *Ar. uliginosa*; W. J. Hooker in *Eng. Bot. Suppl.* t. 2890, as *Ar. uliginosa*; Reichenbach *Icon.* v, t. 219, fig. 4935, as *Alsinanthe stricta.*

*Camb. Brit. Fl.* iii. *Plate 31.* (*a*, *b*) Flowering shoots. (*c*) Portion of branch, with leaves (enlarged). (*d*) Petals (two enlarged). (*e*) Flower (enlarged). (*f*) Ovary (enlarged). (*g*) Calyx enclosing ripening capsule (enlarged). Durham (C. E. M.).

Exsiccata :—Billot, 940; Fries, v, 36.

Perennial, loosely tufted. *Rhizome* very slender. *Leaves* linear, short (rather less than 1 cm. long). *Flowering branches* with elongate internodes above, about 1 dm. high. *Inflorescence* with 1—3 flowers. *Pedicels* up to about 3 cm. long. *Flowers* about 5 mm. in diameter; opening in mid-June or late June. *Sepals* narrowly ovate, acute or subacuminate, 3-nerved. *Petals* narrowly oboval, about as long as the sepals. *Stamens* 8—10. *Stigmas* 3, about a third as long as the ovary. *Ovary* broadly elliptical. *Capsule* rather shorter than the sepals.

This plant, whose only station in the British Isles known to British botanists is the one in upper Teesdale, is recorded by Rouy and Foucaud (*op. cit.* p. 266) for Ireland: we are unable to state whether or not this record is supported by the existence of any specimen.

Very rare; on wet, cold, flat, gravelly ground fed by the water of calcareous springs. Only known in upper Teesdale, Durham, at an altitude of about 550 m., where it is associated with other montane and Arctic-Alpine species.

Iceland, northern and Arctic Europe, mountains of southern Germany, France (Jura), Switzerland (Jura); northern Asia; Greenland.

## 2. ALSINE VERNA. Plate 32

*A. pusilla pulchro flore folio tenuissimo nostras* Ray *Syn.* ed. 2, 35 (1677); ed. 3, 350 (1724).

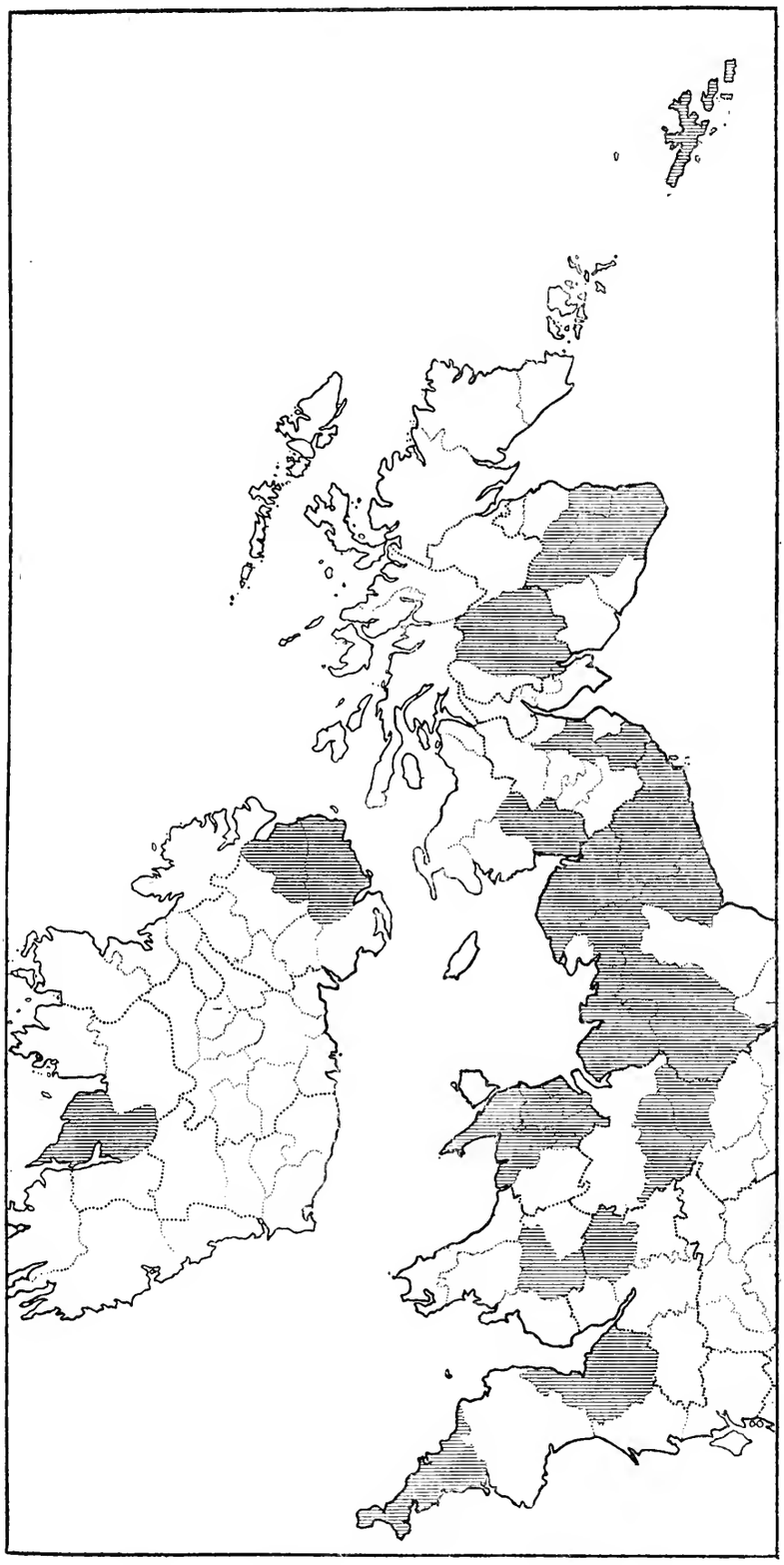
**Alsine verna** [Wahlenberg *Fl. Lapp.* 129 (1812) nomen;] Bartling in Bartling und Wendlund *Beitr.* ii, 63 (1825); Syme *Eng. Bot.* ii, 109 (1864); Rouy et Foucaud *Fl. France* iii, 268 (1896); *Arenaria saxatilis* Hudson *Fl. Angl.* 168 (1762) non L., incl. *Ar. laricifolia* non L.; *Ar. verna* L. *Mant. Pl.* i, 72 (1767); Smith *Eng. Bot.* no. 512 (1798); *Fl. Brit.* 481 (1800)!; *Ar. liniflora* Jacquin *Fl. Austr.* v, 22, t. 445 (right hand fig.) (1778) non L.; *Ar. juniperina* Withering *Arr.* ed. 3, 424 (1799) non L., incl. *Ar. laricifolia* non L.; *Ar. gerardi* Willdenow *Sp. Pl.* ii, 729 (1799); *Minuartia verna* Hiern in *Journ. Bot.* xxxvii, 320 (1899).

Icones :—Smith *Eng. Bot.* t. 512, as *Ar. verna*; Jacquin *Fl. Austr.* t. 404, as *Ar. verna*; Baxter *Phaen. Bot.* v, t. 384, as *Ar. verna*; Reichenbach *Icon.* v, t. 207, fig. 4927, as *Tryphane caespitosa*; fig. 4929, as *T. verna* var. *leptophylla.*

*Camb. Brit. Fl.* iii. *Plate 32.* (*a*) Flowering shoot. Westmorland (R. S. A.). (*b*) Flowering shoots. (*c*) Pedicel (enlarged). (*d*) Sepals (enlarged). (*e*) Flower (enlarged). Co. Clare (P. O'K.). (*f*) Small plant in flower. (*g*) Portion of stem, with leaves (enlarged). (*h*) Ovary (enlarged). Cornwall (E. W. H.).

Exsiccata :—Dickson, xiii, 17, as *Ar. verna*; Don, 111, as *Ar. verna*; Ehrhart (herb.) 55, as *Ar. caespitosa*; v. Heurck, vii, 305; Noë, 79, as *Sabulina verna*; A. Schultz (*Fl. Istr.*), 21; Tausch; Thielens et Devos, ii, 107; Todaro, 203; Wirtgen, ix, 448.

Perennial, densely or laxly tufted. *Shoot* usually glabrous, rarely glandular. *Leaves* linear-subulate, 3-nerved, short (less than 1 cm. long). *Flowering branches* with short or long internodes, up to nearly 1·5 dm. high. *Inflorescence* with 1—7 flowers. *Pedicels* up to about 2 cm. long, 1—3 times as long as the calyx. *Flowers* about 1 cm. in diameter; June to August. *Sepals* joined a little at the base, ovate, 3—5-nerved, with a narrow whitish border. *Petals* longer than the sepals, elliptical. *Stamens* 10. *Stigmas* 3, nearly as long as the ovary. *Ovary* narrowly and bluntly oval. *Capsule* cylindrical.



Map 12. Distribution of *A. verna* in the British Isles

This is an extremely variable species; and in Gürke's *Plantae Europaeae* ii, pp. 255—258 (1897), 23 varieties are tabulated. It is highly probable that several of these occur in the British Islands; but no serious attempt has been made by British students to relate the indigenous forms to the varieties named by continental botanists. A few British forms have been given names, it is true; but we do not feel satisfied as to the accuracy of these; and we prefer to leave to future students of the genus the task of elucidating the British varieties rather than to take up the varietal names which are in partial use in this country at the present time.

Locally abundant on dry calcareous grassland, on mounds of gravelly débris near old lead mines, on mountains in wet gravelly situations fed by calcareous springs, and in marshes and by stream-sides in submontane districts; in the west and north of Great Britain, namely, Cornwall (near sea-level), Somerset, Wales, the Pennines, the Lake District, southern and central Scotland (670 m. in Perthshire), and Zetland; Ireland—co. Clare, co. Derry, and co. Antrim.

Faeröes, Iceland, northern Russia, Germany (central and southern), Belgium, France (central and eastern), central Europe (ascending to 3090 m. in Switzerland), southern Europe; northern Africa; Asia; North America (as var. *propinqua*) and Greenland.

## 3. ALSINE RUBELLA. Plate 33

**Alsine rubella** Wahlenberg *Fl. Lapp.* 128, t. 6 (1812)!; Syme *Eng. Bot.* ii, 111 (1864); *Ar. sulcata* Schlechtendal in *Gesellsch. Naturf. Freunde Berlin Mag.* vii, 212 (1816); *Arenaria giesekii* Hornemann in *Fl. Dan.* fasc. xxvi, 5 (1818); *Ar. hirta* [Wormskiold ex] Hornemann *op. cit.* fasc. xxviii, 6 (1823); *Ar. rubella* Smith *Eng. Bot.* iv, 267 (1824)!; D. Don in *Eng. Bot. Suppl.* no. 2638 (1830); *Al. verna* var. *rubella* Hartman *Skand. Fl.* ed. 3, 112 (1838); *Al. verna* var. *glacialis* Ledebour *Fl. Ross.* i, 350 (1842); *Minuartia rubella* Hiern *op. cit.* 320 (1899).

Icones:—D. Don in *Eng. Bot. Suppl.* t. 2638, as *Ar. rubella*; Graves and Hooker in Curtis's *Fl. Lond.* ed. 2, t. 203, as *Ar. rubella*; *Fl. Dan.* t. 1518, as *Ar. giesekii.*

*Camb. Brit. Fl.* iii. *Plate 33.* (*a*) Flowering shoot. (*b*) Leaves (enlarged). (*c*) Flower-bud (enlarged). (*d*) Sepals (enlarged). (*e*) Flower (enlarged). (*f*) Ovaries (enlarged) in different stages of development. (*g*, *h*) Ripening capsules (enlarged). (*i*) Burst capsule (enlarged). Perthshire (E. S. M. and C. E. M.).

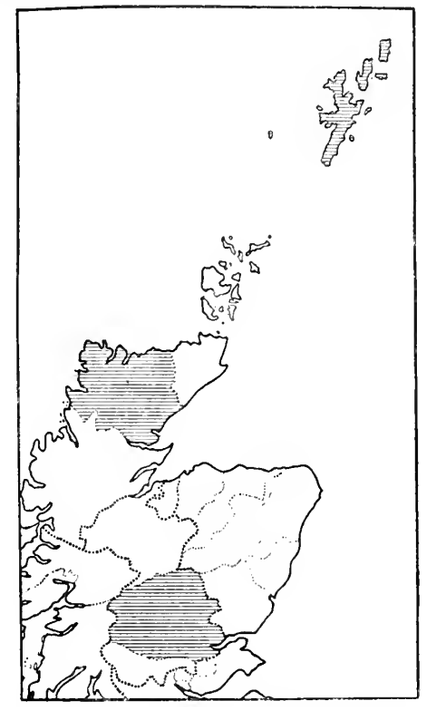
Exsiccata :—Fries, v, 38, as *Al. hirta*; Schultz (*H. N.*, nov. ser.), xxii, 2138, as *Al. hirta.*

Perennial herb, tufted, more or less glandular. *Leaves* linear, blunt, crowded, very short (about 4 mm. long). *Flowering branches* about 3—4 cm. high, with short internodes. *Inflorescence* 1-flowered. *Pedicels* about 5 mm. long. *Flowers* about 6 mm. in diameter; July and early August. *Sepals* rather narrowly ovate, with a scarious border. *Petals* either absent or about as long as the sepals, elliptical to obovate. *Stamens* 8—10. *Stigmas* 3—4, almost as long as the ovary. *Ovary* ovate. *Capsule* ovate, about as long as the calyx.

This Arctic species was first found in this country by G. Don and J. Mackay in 1793 on Ben Lawers in Perthshire; and specimens gathered by Mackay on Ben Lawers in 1796 exist in herb. Smith.

Very rare; cliffs on mountains where the mineral-content is high; from about 880 to 1160 m.; Perthshire, Sutherlandshire, Zetland.

Iceland, Arctic Europe; northern Asia; North America; Greenland. Not known in central Europe.



Map 13. Distribution of *Alsine rubella* in Scotland

## 4. ALSINE TENUIFOLIA. Plate 34

*A. tenuifolia* J. Bauhin *Hist.* iii, 364 (1651); Ray *Cat. Cantab.* 9 (1660); *Syn.* ed. 3, 350 (1724).

**Alsine tenuifolia** Crantz *Inst.* ii, 407 (1766); Wahlenberg *Veg. Helv.* 86 (1813); Syme *Eng. Bot.* ii, 112 (1864); Rouy et Foucaud *Fl. France* iii, 276 (1896); *Arenaria tenuifolia* L. *Sp. Pl.* 424 (1753)!; Smith *Eng. Bot.* no. 219 (1794); *Fl. Brit.* 481 (1800)!; *Minuartia tenuifolia* Hiern in *Journ. Bot.* xxxvii, 321 (1899) non Nees *in litt.* ex Martins *Hort. Erlang.* 44 (1814); *M. leptophylla* H. and J. Groves in Babington's *Man.* ed. 9, 61 (1904).

Icones :—Smith *Eng. Bot.* t. 219, as *Arenaria tenuifolia.*

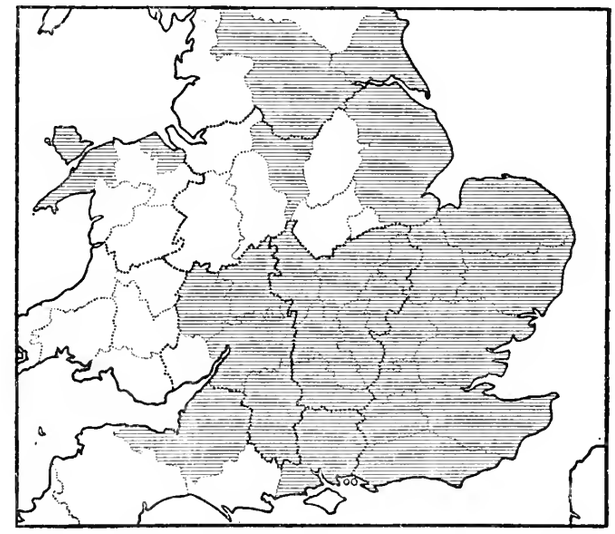
*Camb. Brit. Fl.* iii. *Plate 34.* (*a*) Whole plant in fruit. Suffolk (C. E. M.). (*b*) Branches. (*c*) Flowers, from above and from below (enlarged). (*d*) Fruit before dehiscence. (*e*) Fruit after dehiscence (one enlarged). Hort. (E. W. H.)

Exsiccata :—Dickson, x, 11, as *Arenaria tenuifolia*; Don, 135, as *Ar. tenuifolia*; v. Heurck, iii, 117; Huter, 32, 152; Welwitsch (*Fl. Lusit.*), 208, as *Ar. tenuifolia*; Wirtgen, ix, 449; Fries, i, 41, as *Al. viscosa*; Schultz (*H. N.*), 440, as *Al. viscosa*; (*Fl. Gall. et Germ.*), 1231, as *Al. viscosa*; Wirtgen, ix, 450, as *Al. viscosa.*

Annual. *Shoot* up to 2 dm. high, glabrous or more or less glandular. *Branches* slender, with elongate internodes. *Leaves* linear-subulate, about 1·5 cm. long, with 3—5 veins at the base. *Inflorescence* a typical dichasium, many flowered. *Pedicels* of the terminal flower 1·0—1·5 cm. long. *Flowers* about 4 mm. in diameter; July and August. *Sepals* lanceolate-acuminate, joined at the base, each with 3 veins. *Petals* about half to nearly two-thirds as long as the sepals, oboval. *Stamens* 3—10. *Stigmas* 3—4. *Capsule* narrowly ovate, about 1·1—1·3 times as long as the calyx, with the carpels separating only at the top after dehiscence. *Seeds* punctulate.

The following varieties appear to be very slight.

(*a*) **Al. tenuifolia** var. **vaillantiana** DC. *Prodr.* i, 406 (1824); Rouy et Foucaud *Fl. France* iii, 276 (1896); *Al. tenuifolia* var. *genuina* Willkomm *Icon. et Descr.* i, 106 (1852); Syme *Eng. Bot.* ii, 112 (1864).



Map 14. *Alsine tenuifolia* occurs in the counties which are shaded, though it is perhaps only adventitious in some of them

Icones :—Willkomm *op. cit.* t. 69, fig. A, as *Al. tenuifolia* var. *genuina*; Reichenbach *Icon.* v, t. 204, fig. 4916, as *Sabulina tenuifolia.*

Exsiccata :—Billot, 1137, as *Al. tenuifolia*; Schultz (*H. N.*), 439, as *Al. tenuifolia.*

*Shoot* up to about 2 dm. high. *Petals* about two-thirds as long as the sepals. *Capsule* about 1·3 times as long as the calyx.

(*b*) **Al. tenuifolia** var. **laxa** Willkomm *Icon. et Descr.* i, 106 (1852); Syme *Eng. Bot.* ii, 113 (1864); Rouy et Foucaud *Fl. France* iii, 276 (1896); *Al. laxa* Jordan *Pugill.* 34 (1852).

Icones :—Willkomm *Icon. et Descr.* i, t. 69, fig. B, as *Alsine tenuifolia* var. *laxa.*

Exsiccata :—Billot, 1439, as *Alsine laxa.*

*Petals* one-third to two-thirds as long as the sepals or absent. *Capsule* a little exserted.

France, Switzerland, Spain, Sicily, Greece; south-western Asia.

(*c*) **Al. tenuifolia** var. **hybrida** DC. *Prodr.* i, 406 (1824); Syme *Eng. Bot.* ii, 113 (1864); *Arenaria hybrida* Villars *Prosp. Pl. Dauph.* 48 (1779); *Ar. dubia* Suter *Fl. Helv.* i, 266 (1802); *Alsine hybrida* Jordan *Pugillus* 33 (1852); *Al. tenuifolia* var. *intermedia* Rouy et Foucaud *Fl. France* iii, 277 (1896) incl. var. *viscosa.*

Icones :—*Fl. Dan.* t. 389, as *Al. tenuifolia*; Reichenbach *Icon.* v, t. 204, fig. 4917 (left-hand figure), as *Sabulina viscosa.*

Exsiccata:—Billot, 732, as *Al. viscosa*; 732 bis, as *Al. hybrida*; Reichenbach, 69, as *Al. viscosa*; Schultz (*H. N.*), 440, as *Al. viscosa.*

*Shoot* usually glandular, especially above, usually less tall than in the preceding varieties and with usually shorter leaves and pedicels. *Capsule* as long as the calyx.

France, Switzerland, Spain, Sicily, Malta, and doubtless elsewhere; northern Africa.

Dry walls, sandy arable fields in eastern England, and railway tracks from Somerset, Dorset, and Kent, northwards to Anglesey and Yorkshire. Chiefly in south-eastern, eastern, and central England; North Wales—Flintshire, Carnarvonshire, and Anglesey. In Ireland it is confined to railway tracks over the greater portion of the central plain: doubtless many of its English stations are of a similar nature. Not recorded for Scotland.

Southern Sweden, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; northern Africa; Asia.

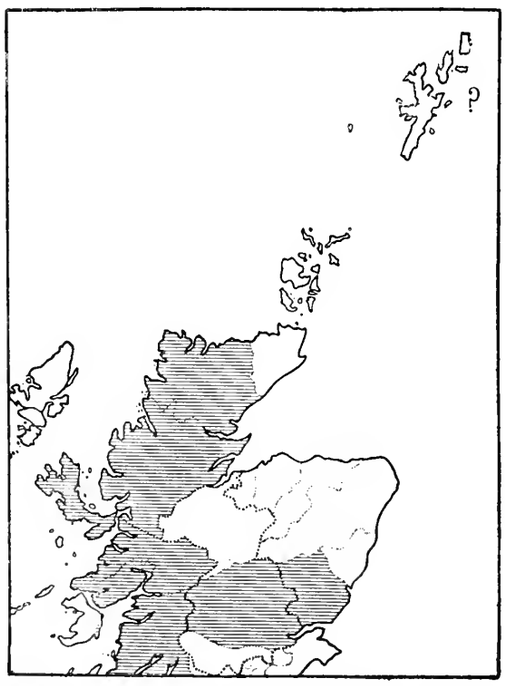
## Subgenus II. *CHERLERIA*

**Cherleria** [Haller *Stirp. Helv.* 391 (1742);] L. *Sp. Pl.* 425 (1753) et *Gen. Pl.* ed. 5, 194 (1754); as a genus; *Cherleriae* Fenzl in Endlicher *Gen. Pl.* 965 (1836—1840).

For characters, see page 32. Only British species :—*Al. sedoïdes.*

## 5. ALSINE SEDOÏDES. Plate 35

**Alsine sedoïdes** Kittel *Fl. Deutschl.* ed. 2, ii, 997 (1844) non Froelich in litt. ex Koch *Syn.* 114 (1835); *Cherleria sedoïdes* L. *Sp. Pl.* 425 (1753)!; Lightfoot *Fl. Scot.* i, 232 (1777); Smith *Fl. Brit.* 483 (1800)!; *Alsine cherleri* Grenier et Godson *Fl. France* i, 253 (1848); Rouy et Foucaud *Fl. France* iii, 265 (1896); *Al. cherleria* Petermann *Deutschl. Fl.* 851 (1849); Syme *Eng. Bot.* ii, 108 (1864); *Minuartia sedoïdes* Hiern in *Journ. Bot.* xxxvii, 321 (1899).



Map 15. Distribution of *Alsine sedoïdes* in Scotland

Icones :—Smith *Eng. Bot.* t. 1212, as *Cherleria sedoïdes*; Reichenbach *Icon.* v, t. 204, fig. 4903, as *Cherleria sedoïdes.*

*Camb. Brit. Fl.* iii. *Plate 35.* (*a*) Portions of a plant. (*b*) Opposite pair of leaves (enlarged). (*c*) Flowers (enlarged). (*d*) Ovary. (*e*) Mature capsule, within the persistent perianth. Forfarshire (E. S. M.).

Exsiccata :—Billot, 1625, 2634, as *Al. cherleri*; Bourgeau (*Pyr. Esp.*), 221, as *Cherleria sedoïdes*; Dickson, i, 9, as *C. sedoïdes*; Duchartre (*Fl. Pyr.*), 125, as *C. sedoïdes*; Schultz (*H. N.*), ix, 833.

Perennial, densely tufted. *Shoot* glabrous or more or less glandular above. *Flowering stems* about 3 cm. high, densely leafy. *Leaves* linear, obtuse, subtriquetrous, channelled above, about 4 mm. long. *Inflorescences* terminal, 1-flowered. *Pedicel* about 2—3 mm. long. *Flowers* hemidioecious; about 3 mm. in diameter. *Sepals* elliptical, with a narrow whitish margin, 3-nerved, joined at the base. *Petals*

absent or (in some staminate flowers) subulate. *Disc* with 5 linear-oblong glands. *Stamens* 5—10, absent or rudimentary in some flowers. *Stigmas* 3—5, a third to half as long as the ovary. *Capsule* broadly oval, about as long as the calyx. Seeds few, minute.

Summits of mountains, chiefly on rock-*débris* where it is locally very abundant; Perthshire to Sutherlandshire; between 515 and 1215 m. in Perthshire.

Mountains of central Europe (France, Switzerland, Austria) and of southern Europe (France, Spain, Corsica, and Montenegro). Unknown in northern Europe.

### Subgenus III. *HONCKENIA*

**Honckenia** Ehrhart *Beitr.* ii, 181 (1788) as a genus; *Halianthus* Fries *Fl. Hall.* 75 (1817) nomen, as a genus.

For characters, see page 32. Only British species:—*Al. peploïdes.*

## 6. ALSINE PEPLOÏDES. Sea Purslane. Plate 36

*Anthyllis prior lentifolia peplios effigie maritima* Lobel *Adver.* 195 (1570); *Anthyllis lentifolia seu alsine cruciata marina* Johnson in Gerard *Herball* ed. 2, 622 (1636); *Al. marina portulacae* Ray *Syn.* ed. 3, 351 (1724).

**Alsine peploïdes** Crantz *Instit.* ii, 406 (1766); Wahlenberg *Fl. Suec.* i, 282 (1826); *Arenaria peploïdes* L. *Sp. Pl.* 423 (1753)!; Smith *Eng. Bot.* no. 189 (1784)!; *Fl. Brit.* 477 (1800); *Honckenia peploïdes* Ehrhart *Beitr.* ii, 181 (1788); Syme *Eng. Bot.* ii, 106 (1864); Rouy et Foucaud *Fl. France* iii, 261 (1896); *Halianthus peploïdes* Fries *Fl. Halland.* 75 (1817) descr. gen. nulla; *Minuartia peploïdes* Hiern in *Journ. Bot.* xxxvii, 322 (1899).

Icones:—*Eng. Bot.* t. 189, as *Ar. peploides*; *Fl. Dan.* t. 624, as *Ar. peploïdes*; Reichenbach *Icon.* v, t. 213, fig. 3670, as *Honkenya peploïdes.*

*Camb. Brit. Fl.* iii. *Plate 36.* (*a*) Flowering branches. (*b*) Fruiting branches. (*c*) Flowers seen from above and below. Isle of Wight (E. W. H.).

Exsiccata:—Billot, 1623 et 1623 bis, as *Honkenia peploïdes*; Dickson, x, 10, as *Arenaria peploïdes*; Reichenbach, 71, as *Halianthus peploïdes*; Wirtgen, xiii, 735, as *H. peploïdes*; vi, 119, *Herb. Fl. Ingric.*, as *Ammadenia peploïdes.*

Perennial. *Rhizome* descending very deeply into the soil, and often creeping very extensively just below the surface, stouter than in the allied species or genera. *Stems* rather stout and succulent. *Leaves* succulent, broadly oval or elliptical, acute and more or less recurved at the tip, about 1·3 cm. long and half as broad. *Pedicels* about 5 mm. long, stout. *Flowers* hemi-dioecious, about 1 cm. in diameter. *Disc* large. *Sepals* oblong, subacute, with a narrow whitish margin. *Petals* oboval, not contiguous, as long as the sepals in the staminate flowers, shorter in the pistillate ones. *Stamens* 10. *Stigmas* 3—5, very short. *Capsule* subglobose, about 8 mm. in diameter, longer than the calyx. *Seeds* few, large.

Locally abundant on loose sand dunes and shingle banks, in all the maritime counties of the British Isles.

Faeröes, Iceland, Scandinavia, Denmark, Germany, Holland, Belgium, France (chiefly northern and western), Russia, Spain, Portugal; Asia; North America.

### Tribe IV. *STELLARIËAE*

**Stellariëae** Tanfani in Parlatore's *Fl. Ital.* ix, 466 (1892).

For characters, see page 14.

#### Genera of *Stellariëae*

Genus 6. **Arenaria** (p. 38). *Inflorescence* dichasial. *Petals* entire. *Stigmas* fewer than the sepals. *Capsules* longer than broad.

Genus 7. **Moenchia** (p. 42). As in *Cerastium*, but *shoot* glabrous and glaucous, and *petals* entire.

Genus 8. **Cerastium** (p. 43). *Shoot* usually more or less hairy. *Inflorescence* dichasial. *Petals* bifid or notched. *Stigmas* as many as the sepals. *Capsules* longer than broad, often curved.

Genus 9. **Stellaria** (p. 56). *Shoot* usually glabrous or nearly so (but cf. *S. aquatica* and the series *Mediae*). *Inflorescence* dichasial. *Petals* deeply bifid. *Capsules* globose or subglobose.

Genus 10. **Holosteum** (p. 64). *Inflorescence* apparently umbellate. *Petals* jagged. *Capsules* longer than broad.

## Genus 6. Arenaria

**Arenaria** L. [*Gen. Pl.* 133 (1737);] *Sp. Pl.* 423 (1753) et *Gen. Pl.* ed. 5, 193 (1754) emend., incl. *Moehringia*; Gaertner *Fruct.* ii, 232, t. 130 (1791) incl. *Moehringia* p. 226, t. 129; Fenzl in Endlicher *Gen. Pl.* 967 (1836—1840) incl. *Moehringia* p. 968; Williams in *Journ. Linn. Soc.* xxxiii, 332 (1898) emend. to include *Moehringia*; Pax in Engler und Prantl *Pflanzefam.* iii, 1 b, 84 (1889) incl. *Moehringia*; *Alsinella* Gray *Nat. Arr. Brit. Plants* ii, 655 (1821) [non Dillenius].

Perennial tufted herbs or annuals. *Stipules* absent. *Inflorescence* dichasial. *Petals* entire. *Stigmas* fewer than the sepals. *Capsules* cylindrical. *Seeds* arillate or not.

About 100 species; cosmopolitan, especially cold and temperate regions.

### British sections of *Arenaria*

Section I. **Eu-Arenaria** (see below). *Seeds* without an aril.

Section II. **Moehringia** (p. 41). *Seeds* with an aril.

### Section 1. *EU-ARENARIA*

**Eu-Arenaria** nobis. For character, see above.

### British species of *Eu-Arenaria*

1. **Ar. ciliata** (see below). Perennial. *Leaves* crowded and (in the British form) narrowly spathulate, more or less ciliate. *Flowers* large (about 14 mm. in diameter). *Sepals* with the veins hairy.

2. **Ar. norvegica** (p. 39). Perennial. *Leaves* crowded, rather smaller than in *Ar. ciliata* and more succulent. *Pedicels* shorter. *Flowers* smaller (about 8—9 mm. in diameter). *Sepals* glabrous. *Petals* broader.

3. †**Ar. gothica** (p. 40). Annual or biennial. *Shoot* much laxer than in *Ar. ciliata* and *Ar. norvegica*. *Leaves* not crowded. *Flowers* 20 mm. in diameter. *Sepals* carinate, glabrous.

4. **Ar. serpyllifolia** (p. 40). Annual. Upper *leaves* ovate, acute to subacuminate. *Pedicels* up to 3 times as long as the calyx. *Flowers* 4—7 mm. in diameter. *Sepals* ovate-lanceolate. *Petals* shorter than the sepals.

## 1. ARENARIA CILIATA. Plate 37

**Arenaria ciliata** L. *Sp. Pl.* 425 (1753)!; Smith *Eng. Bot.* no. 1745 (1807)!; Wahlenberg *Fl. Lapp.* 151 (1812); *Veg. Helv.* 85 (1813); Syme *Eng. Bot.* ii, 104 (1864); Rouy et Foucaud *Fl. France* ii, 247 (1896); *Ar. tenella* Kitaibel in Schultes *Oesterr. Fl.* ed. 2, i, 662 (1814).

Icones:—Smith *Eng. Bot.* t. 1745; *Fl. Dan.* t. 346; Reichenbach *Icon.* v, t. 219, fig. 4950, as *Ar. multicaulis*.

*Camb. Brit. Fl.* iii. *Plate 37.* (*a*) Flowering branches. (*b*) Portion of pedicel (enlarged). (*c*) Leaves (enlarged). (*d*) Sepals (enlarged). (*e*) Petals (enlarged). (*f*) Ovary. Co. Sligo (R. Ll. P.).

Exsiccata:—Bourgeau (*Pl. Alp. Sav.*); Fries, x, 41; Schultz (*H. N.*), ix, 836.

Perennial, caespitose. *Branches* springing numerously from the crown of the root; prostrate, decumbent, or ascending. *Leaves* sessile; those of the lower barren branches lanceolate, about 5 mm.

long; those of the flowering branches larger and broader, spathulate or elliptical, ciliate at the margin, obtuse. *Inflorescence* 1—2-flowered. *Pedicels* 1—3 times as long as the calyx, pubescent. *Flowers* large, about 1·4 cm. in diameter; June to September. *Sepals* narrow, about 0·5 cm. long and a third as broad, with a white margin. *Petals* almost twice as long as the sepals. *Stamens* 10. *Styles* usually 3, free to the base. *Capsule* broadly ovate.

There is a specimen preserved in the Sloane Herbarium (in Herb. Mus. Brit.), vol. cxxiv, fol. 6, collected by Lhwyd, near Sligo, and sent to Buddle by Dr Richardson. It was probably gathered in 1699, and is named *Lychnis alsinoïdes parva flore albo minima.* See *Journ. Bot.* viii, 324 (1870). It seems not to have been found again until 1806, when Dr J. T. Mackay gathered it on the limestone cliffs of a mountain adjoining Ben Bulben, in co. Sligo.

The nearest habitats to the only British station of the plant are in the French Alps and northern Scandinavia. Other remarkable plants occurring in co. Sligo are *Silene acaulis* (an Arctic-Alpine species), *Thalictrum alpinum* (an Arctic species), *Polygala vulgaris* var. *grandiflora* (perhaps endemic), *Saxifraga nivalis* (an Arctic species), and *Poa alpina* (an Arctic-Alpine species).

Only in co. Sligo, Ireland, where it occurs on the rocky, limestone slopes of the Ben Bulben range, ascending to 500 m.

Northern Scandinavia and Russia, the Alps (ascending to 2500 m.), the Carpathians, and the Apennines; Greenland.

## 2. ARENARIA NORVEGICA. Plate 38

**Arenaria norvegica** Gunnerus *Fl. Norv.* ii, 144, t. 9, figs. 7—9 (1772); Hooker *Fl. Brit.* ed. 4, 182 (1838); Graham in *Eng. Bot. Suppl.* no. 2852 (1841) excl. syn. mult.; Syme *Eng. Bot.* ii, 104 (1864); *Ar. humifusa* Wahlenberg *Fl. Lapp.* 129 (1812); *Ar. ciliata* subsp. *norvegica* Fries *Fl. Suec. Mant.* ii, 34 (1839); Fries *Veg. Scand.* 158 (1846).

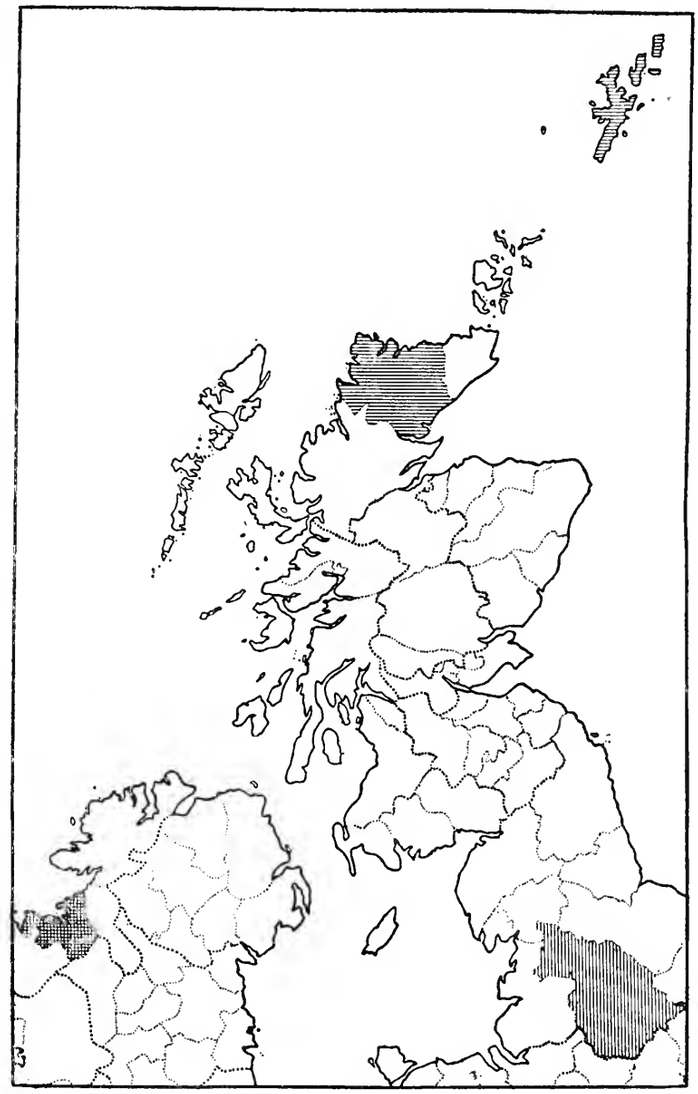
Icones :—Graham in *Eng. Bot. Suppl.* t. 2852; *Fl. Dan.* t. 1269, as *Ar. norvegica.*

*Camb. Brit. Fl.* iii. *Plate 38.* (*a*) Fertile shoots. (*b*) Leaves (enlarged). (*c*) Ovary (enlarged). (*d*) Ripening capsule (enlarged). (*e*) Split capsule (enlarged). Sutherlandshire (G. C. D. and A. H. E.).

Exsiccata :—Fries, v, 35.

Perennial, caespitose. *Barren branches* ascending or prostrate. *Leaves* of the barren branches very short (3 mm.); of the flowering branches longer (up to 6 mm.) and broader, obovate, more or less connate; all more or less succulent, usually obtuse, midrib obscure and other nerves not showing, glabrous or more or less ciliolate. *Inflorescence* 1—3-flowered. *Pedicels* 1—2 times as long as the calyx, a little pubescent. *Flowers* about 8—9 mm. in diameter, smaller than in *A. ciliata*; May to July. *Sepals* ovate, acute, 3-nerved, with a broader white margin than in *A. ciliata.* *Petals* about 1·5 times as long as the sepals, relatively broader than in *A. ciliata*, obtuse. *Stamens* 10. *Stigmas* 3—5. *Capsule* ovate, longer than the calyx, dehiscing about a third of the way down.

Sutherlandshire—on loose gravel at an altitude of 70 m.; erroneously recorded for Orkney; Zetland—on barren Serpentine rock at an altitude of 10—13 m., growing with *Cerastium arcticum* forma *nigrescens*, *Arabis petraea*, and *Armeria.*



Map 16. *Arenaria norvegica* occurs in the extreme north of Scotland, *A. gothica* in the West Riding of Yorkshire, and *A. ciliata* in co. Sligo

Iceland, northern Scandinavia. Unknown in central Europe.

## 3. †ARENARIA GOTHICA. Plate 39

**Arenaria gothica** Fries *Fl. Suec. Mant.* ii, 33 (1839)! excl. syn. Wahlenberg; *Summ. Veg. Scand.* 158 (1846); Grenier *Revue Fl. Jura* 47 (1865); Hartman *Skand. Fl.* ed. 11, 243 (1879); Rouy *Suites Fl. France* i, 67 (1887); Whitwell in *Journ. Bot.* xxvii, 354 (1889); *A. ciliata* race *gothica* Rouy et Foucaud *Fl. France* iii, 248 (1896).

Icones:—*Suppl. Fl. Dan.* i, t. 15.

*Camb. Brit. Fl.* iii. *Plate 39.* (*a*) Plant in flower. (*b*) Branch with mature capsules. (*c*) Leaves (3 enlarged) of the flowering stems. (*d*) Ovary (one enlarged). (*e*) Ripening ovary (one enlarged). (*f*) Ripening ovary within the persistent calyx. W. R. Yorkshire (J. C.).

Exsiccata:—Fries, v, 34, as *Ar. ciliata* subsp. *gothica.*

Annual or biennial. *Flowering branches* erect or suberect, more spreading, and more distant, than in *A. ciliata* and in *A. norvegica.* *Leaves* laxly arranged, divaricate, linear to narrowly elliptical or oblong, acute, about 3—4 mm. long and 1—2 broad, acute; of the flowering branches oblong-elliptical, rather acute, about 5 mm. long and 3 broad. *Inflorescence* with 1—2 flowers. *Pedicels* up to 5 times as long as the calyx. *Flowers* about 1 cm. in diameter; late June to September. *Sepals* narrowly ovate, acute, carinate, glabrous. *Petals* about twice as long as the calyx. *Stamens* 10. *Capsule* broadly ovate, longer than the calyx, carpellary teeth about a fifth as long as the whole capsule.

Whatever be the relation of *Ar. ciliata* and *Ar. norvegica,* we have no doubts as to *Ar. gothica* being specifically distinct.

This very rare species (only known from southern Sweden, Yorkshire, and Switzerland) was discovered in Yorkshire by Mr Lister Rotheray, of Skipton, in June, 1889 (cf. *Journ. Bot.* xxvii, p. 314). It is curious, if the plant is indigenous, that it was not noticed before 1889; but, on the other hand, it is difficult to understand how it could have been introduced except by intention. The plant seems to be gradually extending its range in Yorkshire.

Very rare; on loose soil close to a railway station and on cart-tracks on carboniferous limestone in the north of the West Riding of Yorkshire, at an altitude of 310 to 490 metres.

Southern Sweden, Switzerland.

## 4. ARENARIA SERPYLLIFOLIA. Thyme-leaved Sandwort. Plate 40

*Alsine minima* Gerard *Herball* 488 (1597); *Al. minor multicaulis* C. Bauhin *Pinax* 250 (1671); Ray *Syn.* ed. 3, 349 (1724).

**Arenaria serpyllifolia** L. *Sp. Pl.* 423 (1753)!; Smith *Fl. Brit.* 479 (1800)!; Syme *Eng. Bot.* ii, 102 (1864); Rouy et Foucaud *Fl. France* iii, 240 (1896); *Alsine serpyllifolia* Crantz *Instit.* ii, 406 (1766).

Icones:—*Camb. Brit. Fl.* iii. *Plate 40.* For details, see below.

Exsiccata:—Don, 9, as *Ar. serpyllifolia*; Huter, 85, as *Ar. serpyllifolia* var. *sphaerocarpa*; *Herb. Fl. Ingric.* 118, as *Ar. serpyllifolia.*

Annual. *Shoot* glabrous or more or less hairy or glandular-hairy. *Stem* much branched; branches slender, suberect or spreading. *Leaves* sessile, ovate, entire, acute to subacuminate. *Inflorescence* often dichasial, 2—3-flowered. *Pedicels* up to 3 times as long as the calyx. *Flowers* 4—7 mm. in diameter; June and July, and often again in autumn. *Sepals* ovate-lanceolate, acute to very acute. *Petals* from half as long to nearly as long as the sepals. *Stamens* 5—10. *Stigmas* 3. *Capsule* broadly or narrowly ovate, about 1·0 to 1·5 times as long as the calyx. *Seeds* punctate.

(*a*) **A. serpyllifolia** var. **macrocarpa** Lloyd *Fl. Loire-Inf.* 42 (1844); *Ar. lloydi* Jordan *Pugillus* 37 (1852); Boreau *Fl. Centr. France* éd. 3, ii, 109 (1857); Babington *Fl. Cambr.* 304 (1860); *Ar. serpyllifolia* race *lloydi* Rouy et Foucaud *Fl. France* iii, 241 (1896).

Icones:—Reichenbach *Icon.* v, t. 216, fig. 4941 (upper figure), as *Ar. serpyllifolia*; Willkomm *Icon. et Descr.* i, t. 63, fig. A, as *Ar. lloydi.*

*Camb. Brit. Fl.* iii. *Plate 40.* (*a, b*) Flowering shoots. (*c*) Portion of stem and leaves (enlarged). (*d, e*) Persistent calyx and fruit (enlarged). *a, c, e* from Sussex (T. H.); *b, d* from Jersey (E. W. H.).

Exsiccata:—Billot, 3541, as *Ar. lloydi.*

More robust than the other varieties. *Sepals* with the veins stronger and more elevated. *Petals* nearly as long as the sepals. *Capsules* larger. *Seeds* about 0·5 mm. long.

Local, near the sea, chiefly on sand-dunes more rarely on rocks and walls; known from the Channel Isles northwards to Lancashire, the Isle of Man, and Norfolk; Scotland—Forfarshire; Ireland—co. Wexford.

Northern and western France, and probably elsewhere.

(*b*) **A. serpyllifolia** var. **sphaerocarpa** Syme *Eng. Bot.* ii, 102 (1864); *A. sphaerocarpa* Tenore *Relaz. del Viagg. di Abruzzo* in *Atti Acad. Pontan.* i, 212 (1829); *Syll.* 219 (1831); Gussone *Syn. Fl. Sicul.* i, 495 (1842); *A. serpyllifolia* Gussone *op. cit., Add.* p. 824 (1843); Godron *Fl. Lorr.* ed. 2, i, 122 (1857); Babington *Fl. Cambr.* 303 (1860).

Icones:—*Eng. Bot.* t. 923, as *A. serpyllifolia*; Curtis *Fl. Lond.* i, t. 87, as *A. serpyllifolia*; *Fl. Dau.* t. 977, as *A. serpyllifolia*; Reichenbach *Icon.* t. 216, fig. 4941 (two lower figures), as *A. serpyllifolia*; Wilkomm *Icon. et Descr.* i, t. 63 c, as *A. serpyllifolia.*

Exsiccata:—Linn. herb., as *Arenaria serpyllifolia*; Billot, 1138, as *Ar. serpyllifolia*; Dickson, xvi, 3, as *Ar. serpyllifolia*; Fries, xvi, 46, as *Ar. serpyllifolia.*

*Sepals* broader than in var. *tenuior*. *Capsule* broader than in var. *tenuior*.

Commoner in this country than var. *macrocarpa* or var. *tenuior*, and the usual plant of cornfields and waste places, but also occurring on walls.

Distribution of the species. Adventitious in North America.

(*c*) **A. serpyllifolia** var. **tenuior** Mertens und Koch *Deutschl. Fl.* ed. 3, iii, 266 (1831); Babington *Manual* ed. 4, 52 (1856); *A. serpyllifolia* Tenore *Syll. Fl. Neap.* 219 (1831); *A. serpyllifolia* var. *genuina* Godron *Fl. Lorr.* 103 (1843) non al.; *A. leptoclados* Gussone *Fl. Sicul. Syn.* ii, 824 (1843); Godron *Fl. Lorr.* ed. 2, i, 123 (1857); Lloyd *Fl. Ouest. Fr.* 77 (1854); Boreau *Fl. Centr. Fr.* éd. 3, ii, 109 (1857); *A. serpyllifolia* var. *leptoclados* Reichenbach *Icon.* v, 32 (1841); Syme *Eng. Bot.* ii, 102 (1864); Corbière *Fl. Normaud.* 103 (1893); *A. serpyllifolia* subsp. *leptoclados* Rouy et Foucaud *Fl. France* iii, 242 (1896).

Icones:—Babington in *Eng. Bot. Suppl.* t. 2972, as *Ar. leptoclados*; Reichenbach *Icon.* v, t. 216, fig. 4941 *β*, as *Ar. serpyllifolia* var. *leptoclados.*

*Camb. Brit. Fl.* iii. *Plate 40.* (*f*) Flowering shoot. (*g*) Inflorescence. (*i*) Flower (seen from below) (enlarged). (*j*) Flower (seen from above) (enlarged). Somerset (E. W. H.).

Exsiccata:—Billot, 1139, as *Ar. leptoclados*; v. Heurck, i, 1, as *Ar. leptoclados*; Todaro, 412, as *Ar. leptoclados.*

More slender than the other varieties. *Sepals* lanceolate, acuminate. *Capsules* narrow.

Distribution of the species. North America (adventitious).

Dry places; on sand-dunes, sandy heaths, rocks, walls, and in cultivated land; throughout almost the whole of the British Isles; ascending to 600 m.

Scandinavia (to 69° N.), Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 2500 m.), Russia, southern Europe; Africa; Asia (eastwards to Japan); America (not indigenous).

### Section 2. *MOEHRINGIA*

**Moehringia** [L. *Gen. Pl.* ed. 2, 167 (1742);] *Sp. Pl.* 359 (1753) et *Gen. Pl.* ed. 5, 170 (1754) as a genus; Bentham and Hooker *Gen. Pl.* i, 150 (1862) as a section; Pax *op. cit.* p. 84, as a genus.

For character, see page 38. Only British species:—*Ar. trinervia.*

## 5. ARENARIA TRINERVIA. Plate 41

*Alsine plantagiuis folio* J. Bauhin *Hist. Pl.* iii, 363 (1651); Ray *App. Cat. Cantab.* ed. 2, 2 (1685); *Syn.* ed. 3, 349 (1724).

**Arenaria trinervia** L. *Sp. Pl.* 423 (1753)!; Smith *Fl. Brit.* 478 (1800)!; Syme *Eng. Bot.* ii, 101 (1864); *Alsine trinervia* Crantz *Iust.* ii, 406 (1766); *Moehriugia triuervia* Clairville *Man. d'Herb.* 150 (1811); Rouy *Fl. France* iii, 255 (1896).

Icones:—Smith *Eng. Bot.* t. 1483; Curtis *Fl. Lond.* ii, 86; *Fl. Dan.* t. 429; Reichenbach *Icon.* v, t. 216, fig. 4943, as *Moehringia triuervia.*

*Camb. Brit. Fl.* iii. *Plate 41.* (*a*) Flowering shoot. (*b*) Sepals (enlarged). (*c*) Seeds (enlarged). Surrey (E. W. H.). (*d*) Flowering shoots. (*e*) Leaves. (*f*) Sepals (enlarged). (*g*) Ovary (enlarged). (*h*) Seeds (enlarged). Jersey (E. W. H.).

Exsiccata:—Billot, 1834, as *Moehringia triuervia*; Don, 137; *Herb. Fl. Ingric.* i, 116, as *M. triuervia.*

Biennial. *Winter branches* numerous, prostrate. *Flowering branches* ascending or decumbent, terete, with short decurved hairs all round. *Petioles* of the leaves of the barren branches about as long as the laminae, of the flowering branches about a fifth as long. *Laminae* of the barren branches suborbicular, about 1 cm. long; of the flowering branches elliptical, acute, 3—5 nerved, up to about 2·5 cm. long and 1·5 broad; all more or less ciliate. *Pedicels* very long. *Flowers* about 5 mm. in diameter; May to early July. *Sepals* lanceolate, acuminate, 1—3 nerved, margin slightly membranous, keeled, with short hairs on the margin and midrib, about 5 mm. long. *Petals* about two-thirds as long as the sepals. *Stamens* 5—10, filaments and anthers white. *Styles* 3, free, white. *Capsule* subglobose, nearly as long as the calyx. *Seeds* with an aril.

There is an allied form with laminae not ciliate and with rougher seeds. The figure in the *Eng. Bot.* (t. 1483) is sometimes cited as this; and Mr H. G. Carter two or three years ago sent us a plant from Devonshire which seemed to be it. We set out its citations below.

[(*b*) **Ar. trinervia** var. **divaricata** Salis-Marschlins in *Flora* Beibl. ii, 71 (1834); *Ar. pentandra* Dufour in *Ann. Sc. Géu. Phys.* vii, 292 (1820); *Moehringia pentandra* Gay in *Ann. Sc. Nat.* xxvi, 230 (1832); Grenier et Godron *Fl. France* i, 257 (1848); *M. trinervia* var. *pentaudra* Webb in Parker-Webb et Berthelot iii, pt. ii, i, 150 (1836—1840); Caruel in Parlatore's *Fl. Ital.* ix, 553 (1892); *M. triuervia* subsp. *pentandra* Rouy et Foucaud *Fl. France* iii, 256 (1896).

Icones :—? Smith *Eng. Bot.* t. 1483, as *Ar. trinervia*; Willkomm *Icon. et Descr.* i, t. 58, as *Moehringia pentandra.*

Exsiccata :—Billot, 1385, as *Moehriugia pentandra.*

Cf. Syme *Eng. Bot.* ii, p. 101.]

Damp or rather dry woods and hedgerows; from the Channel Isles, Cornwall and Kent, northwards to Caithness-shire; throughout Ireland.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 1467 m. in the Tyrol), Russia, southern Europe; Asia.

## Genus 7. Moenchia

By G. CLARIDGE DRUCE, M.A.

**Moenchia** Ehrhart *Beitr.* ii, 177 (1788) non Medikus nec Necker nec Roth nec Wenderoth; Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 81 (1889); *Sagiua* L. *loc. cit.*, p. min. p.; *Cerastium* sect. *Moeuchia* Fenzl in Endlicher *Geu. Pl.* 970 (1836—1840); *Alsinella* [Dillenius *App. Cat. Giss.* 124 (1719);] Moench *Meth. Pl.* 222 (1794) non Swartz nec Hornemann nec S. F. Gray.

Annual herbs, differing from *Sagina* in the *capsule* dehiscing by twice as many teeth as there are stigmas, from *Alsine* and *Arenaria* in the isomerous *gynoecium*, and from *Cerastium* in the entire or subentire *petals.*

*Moenchia* connects *Arenaria* and *Cerastium.*

About 6 species; Europe (excl. northern and Arctic); northern Africa; south-western Asia.

### 1. MOENCHIA ERECTA. Plate 42

*Holosteum uiinimum tetrapetalou sive alsiue tetrapetalos caryophylloïdes* Ray *Cat. Augl.* 168 (1670); *Alsiuella foliis caryophylleïs* Dillenius *Cat. Giss.* 47 (1719); Ray *Syn.* ed. 3, 344, t. 15, fig. 4 (1724).

**Moenchia erecta** Gaertner, Meyer, und Scherbius *Fl. Wetter.* i, 219 (1799); Smith *Eng. Fl.* i, 241 (1824); *Sagina erecta* L. *Sp. Pl.* 128 (1753)!; Smith *Eng. Bot.* no. 609 (1799); *Fl. Brit.* 200 (1800)!; *M. quaternella* Ehrhart *Beitr.* ii, 178 (1788)!; Williams in *Jouru. Bot.* xxxix, 365 (1901); *M. glauca* Persoon *Syn.* i, 153 (1805); *Cerastium quateruellum* Syme *Eug. Bot.* ii, 77 (1864); Rouy et Foucaud *Fl. Frauce* iii, 224 (1896); *C. glaucum* var. *quaternellum* Grenier *Mouogr.* 49 (1841); *C. erectum* Cosson et Germain *Fl. Env. Paris* 39 (1845).

Icones :—Smith *Eug. Bot.* t. 609, as *Sagiua erecta*; Curtis *Fl. Lond.* i, 34, as *S. erecta*; Baxter *Brit. Phaen. Bot.* vi, t. 460; Reichenbach *Icou.* v, t. 227, fig. 4953.

*Camb. Brit. Fl.* iii. *Plate 42.* (*a—d*) Whole plants. (*e*) Flower (enlarged). (*f*) Fruits (one enlarged). Hertfordshire (J. E. L.).

Exsiccata :—Billot, 1142, as *Cerastium quaternelluu*; 1142 ter, as *C. erectum*; Dickson, vi, 6, as *Sagiua erecta*; Ehrhart (*Phyt.*), 82, as *M. quaternella*; v. Heurck et Martinis, viii, 354, as *C. quateruellum*; Huter, Porta, et Rigo (*Ex Itin. Ital.* iii), 738; Reichenbach, 386; Schultz (*H.N.*), 444, as *C. erectum*; Todaro, 655; Wirtgen, ix, 451.

Annual. *Shoot* rather glaucous, glabrous. *Branches* erect or ascending and decumbent, 2—10 cm. *Laminae* of the central rosette linear, acute, soon withering, up to 1 cm. long and about 1 mm. broad; of the branches linear, obtuse, in 1—5 pairs. *Inflorescence* with 1—3 flowers. *Bracts* leaf-like, acute or very acute, scarious at the margin. *Pedicels* long (1—3 cm.). *Flowers* tetramerous, about 8—9 mm. in diameter; March to early June. *Sepals* lanceolate, scarious at the margin, very acute to acuminate. *Petals* oblong, entire, a little shorter than the sepals. *Stamens* 4, antipetalous. *Stigmas* very short. *Capsules* cylindrical, 1·1—1·4 times as long as the calyx teeth scarcely recurved. *Seeds* punctulate, brownish, about 1 mm. long.

According to Mr R. Ll. Praeger (*in litt.*), Syme's record (*op. cit.*) of *Moenchia erecta* for Ireland is an error.

Locally common in the south of England, rare in the north; dry grassland, banks, sea-cliffs, sand-dunes; on dry gravelly, sandy, or light loamy soils; usually quite lowland, but ascending to 360 m. in Carnarvonshire; from the Channel Isles, Cornwall, and Kent to the Border. Unknown in Scotland and Ireland.

Germany, Holland, Belgium, France, central Europe, southern Europe; North America. An allied species (*M. octandra*) is found in southern Europe, northern Africa, and south-western Asia.

Map 17. Distribution of *Moenchia erecta* in England

## Genus 8. Cerastium

By G. CLARIDGE DRUCE, M.A.

**Cerastium** [Dillenius *Cat. Giss.* 41 (1719);] L. *Sp. Pl.* 437 (1753) et *Gen. Pl.* ed. 5, 199 (1754) descr. emend.; Villars *Hist. Plant. Dauph.* i, 226 (1786); Grenier *Monogr.* (1841); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 80 (1889); *Myosotis* [Tournefort *Inst.* 224, t. 126 (1700);] Moench *Meth. Pl.* 224 (1794) non [Dillenius nec] L.; *Centunculus* [Adanson *Fam. Pl.* ii, 256 (1763) incl. *Prevotia*;] Scopoli *Fl. Carn.* ed. 2, i, 320 (1772) non [Dillenius nec] L.

Perennial or annual herbs, usually hairy, glandular and eglandular hairs usually present. *Leaves* sessile or almost so; laminae usually broader and less rigid than in *Stellaria*. *Inflorescence* sometimes reduced to a single flower. *Flowers* monoclinous, protandrous, $n$-merous ($n = 5$ or 4). *Sepals* persistent, appressed to the capsule. *Petals* white, bidentate or bifid, rarely rudimentary or absent. *Stamens* either $n+n$ or $n$, rarely 3, the antisepalous ones the first to flower. *Stigmas* $n$ and antipetalous, rarely 3 or 4. *Capsule* longer than broad, usually about twice as long as broad. *Seeds* $\infty$, tuberculate or granulate.

About 100 species; cosmopolitan.

### British sections of *Cerastium*

Section I. **Orthodon** (p. 44). *Stem* with hairs all the way round. *Stamens* $n+n$ or $n+0$. *Stigmas* $n$. *Capsule* much longer than broad, a little curved. ($n = 5$ or 4.)

Section II. **Dichodon** (p. 55). *Stem* with lines of hairs. *Stamens* $n+n$. *Stigmas* $n-2$ (rarely $n-1$ or $n$). *Capsule* longer than broad, relatively shorter and broader than in *Orthodon*, straight. ($n = 5$ or 4.)

## Section I. *ORTHODON*

**Orthodon** [Seringe mss, ex] DC. *Prodr.* i, 415 (1824); Rouy et Foucaud *Fl. France* iii, 202 (1896).

For characters, see page 43.

### British series of *Orthodon*

Series i. **Alpina** (see below). Perennial. *Shoot* with long fertile branches and shorter barren branches. *Flowers* pentamerous. *Petals* longer than, usually about twice as long as the sepals. *Stamens* $n+n$ ($n=5$).

Series ii. **Viscosa** (p. 50). Annual. *Shoot* with no barren branches. *Flowers* pentamerous or tetramerous. *Petals* about as long as, or a little shorter than, the sepals. *Stamens* usually $n$, rarely more ($n=5$ or 4).

### Series i. *ALPINA*

**Alpina** Moss in *Camb. Brit. Fl.* iii, 44.

I here include *C. arcticum* in this series, although, as a matter of fact, it is really a connecting link between the series *Alpina* and a series including *C. latifolium* L. (non Sm.), which otherwise is not represented in the British flora.

For characters, see above.

### British species and hybrids of *Alpina*

1. **C. arvense** (see below). *Shoot* usually more or less pubescent. *Laminae* linear-lanceolate. *Inflorescence* with several flowers. *Petals* much longer than the sepals. *Seeds* tuberculate; testa close-fitting.

2. **C. alpinum** (p. 46). *Shoot* (in the British form) covered with long, white, soft hairs. *Laminae* broadly oval or elliptical. *Inflorescence* usually with 1—2 flowers. *Petals* much longer than the sepals. *Seeds* acutely tuberculate; testa close-fitting.

***C. alpinum* × *arcticum*** (p. 46). *Shoot* pubescent. *Laminae* narrowly elliptical. *Flowers* and *seeds* intermediate between those of the putative parents.

***C. alpinum* × *vulgatum*** (p. 47). Intermediate between the putative parents, as seen specially in the inflorescence.

3. **C. arcticum** (p. 47). *Shoot* covered with rather stiff yellowish hairs. *Laminae* oval or elliptical. *Inflorescence* usually with 1—2 flowers. *Petals* much longer than the sepals. *Seeds* large (nearly 3 mm.), tuberculate; testa rather loose.

***C. arcticum* × *vulgatum*** (p. 48). Intermediate between the putative parents.

4. **C. vulgatum** (p. 48). *Shoot* usually pubescent. *Laminae* rather narrowly elliptical. *Inflorescence* with several flowers. *Petals* longer than or (in the common form) only as long as the sepals. *Seeds* punctate.

## 1. CERASTIUM ARVENSE. Field Chickweed. Plate 43.

*Caryophyllus holostius* Gerard *Herball* 477 (1597); *Auricula muris pulchro flore albo* J. Bauhin *Hist.* iii, pt. 2, 360 (1651); Ray *Cat. Cantab.* 19 (1660); *Caryophyllus arvensis hirsutus flore majore* C. Bauhin *Pinax* 210 (1671); Ray *Syn.* ed. 3, 348 (1724).

**Cerastium arvense** L. *Sp. Pl.* 438 (1753)!; Smith *Eng. Bot.* no. 93 (1793); *Fl. Brit.* 499 (1800)!; Syme *Eng. Bot.* ii, 88 (1864); Rouy et Foucaud *Fl. France* iii, 202 (1893); *C. mutabile* [subsp.] *arvense* Grenier *Monogr. Cerast.* 68 (1841).

Perennial. *Shoot* straggling, procumbent, rooting freely, usually more or less pubescent, branches 5—30 cm. long. *Laminae* linear-lanceolate, about 2 cm. long and 3 mm. broad. *Inflorescence* lax, with 3—15 flowers. *Bracts* lanceolate, with scarious margins, much smaller than the leaves. *Pedicels* at maturity 2—4 times as long as the calyx. *Flowers* 10—18 mm. in diameter; April to July. *Sepals* narrowly ovate, with scarious margins. Petals about twice as long as the sepals. *Capsule* a little longer than the calyx. *Seeds* reddish-brown, with small but conspicuous tubercles; testa close-fitting.

(*a*) **C. arvense** var. **angustifolium** Fenzl in Ledebour *Fl. Ross.* i, 413 (1842); Rouy *Fl. France* iii, 202 (1896); *Centunculus angustifolius* Scopoli *Fl. Carn.* ed. 2, i, 322, t. 19, fig. 551 (1772); *C. arvense* var. *pubescens* Syme *Eng. Bot.* ii, 89 (1864).

Icones :—Smith *Eng. Bot.* t. 93, as *C. arvense*; Curtis *Fl. Lond.*, i, 94, as *C. arvense*; *Fl. Dan.* t. 626, as *C. arvense*; Reichenbach *Icon.* v, t. 234, fig. 4980, as *C. arvense.*

*Camb. Brit. Fl.* iii. *Plate 43.* (*a—b*) Flowering branches. Cambridgeshire (C. E. M.).

Exsiccata :—Billot, 2228, as *C. arvense*; Don, 212, as *C. arvense*; Fries, xv, 41, as *C. arvense*; *Fl. Austr.-Hung.* 3242, as *C. arvense*; *Herb. Fl. Ingric.* viii, 104, as *C. arvense.*

*Shoot* softly pubescent. *Inflorescence* with 3—10 flowers.

This is the common British plant, with a foreign distribution as in the species.


Map 18. Distribution of *C. arvense* in the British Islands

(*b*) **C. arvense** var. **andrewsi**[1] Syme *Eng. Bot.* ii, 89 (1864); [*C. arvense* var. *strictum* Andrews ex Watson in *Phyt.* ii, 441 (1846 nomen).]

*Stems* rigid, rather brittle, very slightly hairy, the hairs very short and reflexed. *Laminae* greener than in var. *angustifolium*, crowded, subglabrous, ciliate, somewhat recurved, with a prominent midrib. *Inflorescence* with only 1 flower.

Ireland—Great Arran Isles, co. Galway, and on the Burren, co. Clare. Not known on the continent of Europe.

(*β*) var. **andrewsi** forma **glabrescens** Druce in Moss *Camb. Brit. Fl.* iii, 45; *C. arvense* var. *glabrescens* Druce *Fl. Berksh.* 92 (1897) nomen.

*Shoot* green, glabrescent, less rigid than the Irish forms of var. *andrewsi*, and merging gradually into var. *angustifolium.*

[1] After William Andrews (1802—1880) who discovered the plant in 1845 in co. Galway (see *Phyt.* ii, 441 (1846)).

This *forma* differs from *C. strictum* L. in the following characters:—*Laminae* less rigid and wider; *inflorescence* with more flowers; *petals* broader.

Calcareous and sandy places, Suffolk (cf. *Bot. Exch. Club Brit. Is. Rep. for 1887*, p. 169), Berkshire.

*C. arvense* is locally abundant in the lowlands (to 200 m.) on dry sandy, gravelly, and calcareous grassy heaths, banks, roadsides, and fallow fields. From Cornwall, and Kent northwards to Sutherlandshire; local in Wales, Scotland, and Ireland; commonest in the east of England.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 1600 m. in the Tyrol), Russia, southern Europe; northern Africa; Asia; America, from Labrador to Tierra del Fuego.

## 2. CERASTIUM ALPINUM. Alpine Chickweed. Plates 44; 45

*Alsine myosotis lanuginosa alpina grandiflora seu auricula muris villosa flore amplo membranaceo* Ray *Syn.* 147 (1690); ed. 3, 349 (1724).

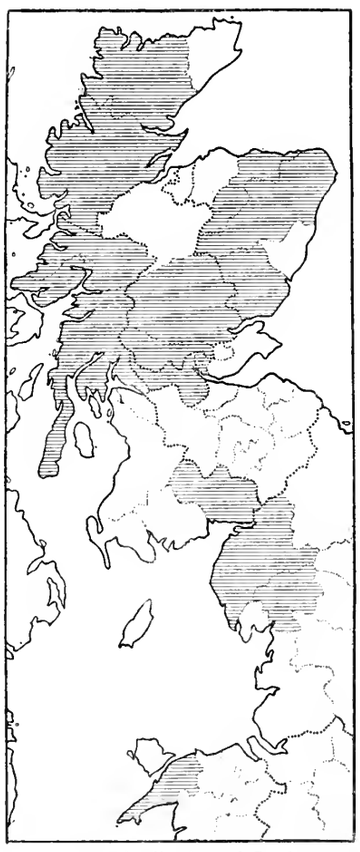
**C. alpinum** L. *Sp. Pl.* 438 (1753); Smith *Eng. Bot.* no. 472 (1798) excl. syn. Ray; *Fl. Brit.* 500 (1800)!, excl. syn. Ray; Syme *Eng. Bot.* ii, 84 (1864)!, excl. var. *pubescens* p. 85; Rouy et Foucaud *Fl. France* iii, 204 (1896); *C. tomentosum* Hudson *Fl. Angl.* 176 (1768) excl. syn. Ray, non L.; *C. latifolium* Lightfoot *Fl. Scot.* 242, t. 10 (1777) non L. nec Smith; *C. mutabile* [subsp.] *alpinum* Grenier *Mon. Cerast.* 71 (1841).

Icones:—Smith *Eng. Bot.* t. 472; *Fl. Dan.* t. 6; Reichenbach *Icon.* vi, t. 232, fig. 4976, as *C. lanatum.*

*Camb. Brit. Fl.* iii. *Plate 44.* (*a—h*) Fertile shoots. (*i*) Seeds (two enlarged). (*a—c*) Edinburgh Botanic Garden (I. B. B.). (*d—i*) Cambridge Botanic Garden, origin Ben Lawers, Perthshire (R. I. L.).

Exsiccata:—Bourgeau (*Pyr. Esp.*), 214, as *C. alpinum* var. *lanatum*; Don, 62, as *C. latifolium*; Fellman, 62, as *C. alpinum* var. *lanatum*; *Fl. Austr.-Hung.*, 556, as *C. lanatum.*

Perennial. *Shoot* (in the British form) covered with long woolly hairs. *Laminae*—lower ones ovate or obovate to elliptical; upper ones broadly elliptical, obtuse. *Inflorescence* with 1—2 flowers, with a pair of bracts at the base, and the second branch with an additional pair. *Bracts* much smaller than the leaves, up to 5 mm. long, either wholly scarious or with a scarious margin. *Flowers* pentamerous, about 1·5—1·8 cm. in diameter, more campanulate than in *C. arcticum*; June and July. *Sepals* elliptical, rather acute, with a scarious margin. *Petals* about twice as long as the sepals. *Stigmas* 5. *Capsule* narrowly cylindrical, nearly twice as long as the calyx, slightly curved. *Seeds* small (1·0—1·5 mm. long), brown, covered with rather prominent tubercles; testa close-fitting.



Map 19. Distribution of *C. alpinum* in Great Britain

The British form is the one covered with long woolly hairs. Its synonymy is as follows:—*C. alpinum* var. *lanatum* Gaudin *Fl. Helv.* iii, 247 (1828); Syme *Eng. Bot.* ii, 85 (1864); *C. lanatum* Lamarck *Encycl.* i, 680 (1783). It occurs in Iceland, Scandinavia, France (the Pyrenees), central Europe, Russia, Spain, Bosnia, and Greenland. It is distinguished by long, soft, hairs on the shoot, and by the leaves usually shorter and broader than in the less hairy non-British form.

Syme's *C. alpinum* var. *pubescens* seems to be a mixture of *C. alpinum* × *arcticum* and *C. alpinum* × *vulgatum.*

There are altogether four definite British Alpine forms of *Cerastium*, namely, *C. alpinum*, *C. arcticum*, *C. vulgatum* var. *alpinum*, and *C. cerastioïdes.* The first three of these, when growing together, may be expected to furnish hybrids; and the resulting forms are often very puzzling.

Local; in damp, grassy Alpine slopes, rock-ledges, and especially on *débris* of mica-schist or granite; Carnarvonshire, the Lake District, Dumfriesshire, and central and northern Scotland; ascending to 1300 m. in Perthshire, and descending to about 800 m. or (where washed down) to 460 m. in Aberdeenshire and 300 m. in Perthshire.

Arctic and Alpine Europe (including the Faeröes and Iceland, and ascending to 2750 m. in Switzerland) and Asia, eastwards to Japan; North America—Greenland and Labrador to Alaska and southwards to Arizona and California.

***C. alpinum* × *arcticum*** Gürke *Plant. Eur.* ii, 222 (1899); *C. alpinum* var. *pubescens* Syme *Eng. Bot.* ii, 85 (1864) partim; *C. alpinum* × *edmondstoni* Murbeck in *Bot. Not.* 249 (1898); *C. alpinum* × *nigrescens* Druce in *Bot. Exch. Club Brit. Rep. for 1910*, ii, 498 (1911).

Exsiccata:—Herb. Druce, 3682, 4714.

*Shoot* less woolly than *C. alpinum*. *Laminae* ovate, more acute, greener, the pubescence shorter. *Upper bracts* with a distinct scarious margin. *Pollen* defective. *Capsule* short. *Seeds* usually abortive.

With the assumed parents on the higher Scottish mountains, as in Perthshire (Ben Lawers and Ben Heasgarnich). Sweden.

***C. alpinum* × *vulgatum*** Samzelius in *Bot. Notiser* 177 (1890); × *C. laestadianum* Samzelius *loc. cit.*; *C. alpinum* var. *pubescens* Syme *Eng. Bot.* ii, 85 (1864) partim.

Icones :—*Camb. Brit. Fl.* iii. *Plate 45*. (*a*) Fertile shoot. (*b*) Petals. (*c*) Ovary. (*d*) Seeds (enlarged) Banffshire (E. S. M.).

Exsiccata :—Herb. Druce, 2648, 5875, 6514.

*Shoot* erect or ascending, loosely caespitose. *Laminae* narrower than in *C. alpinum*, obovate to obovate-lanceolate, less hairy than *C. alpinum* var. *lanatum*, the hairs shorter and nearly eglandular. *Inflorescence* with 3—6 flowers. *Sepals* usually narrower than in *C. alpinum*. *Petals* about twice as long as the sepals.

High Scottish mountains, as in Perthshire (Ben Lawers), Argyllshire (Ben Laiogh), Inverness-shire, and Banffshire.

Sweden.

## 3. CERASTIUM ARCTICUM. Arctic Chickweed. Plate 46

*Alsines myosotis facie lychnis alpina flore amplo niveo* Lhwyd in Ray *Syn.* 147 (1690); ed. 3, t. 15, fig. 2, 349 (1724).

**Cerastium arcticum** Lange *Fl. Dan.* l, 7, t. 2963 (1880) tab. emend.; in *Overs. Vid. Selsk. Forhand.* 119 (1880); *C. alpinum* Hudson *Fl. Angl.* 176 (1762) excl. syn. Bauhin, non L.; *C. latifolium* Smith *Eng. Bot.* no. 473 (1798); *Fl. Brit.* 501 (1800)!; excl. syn. Raii; Babington *Man.* 53 (1843); Syme *Eng. Bot.* ii, 86 (1864); non L.; *C. alpinum* var. *smithi* Hooker *Stud. Fl.* ed. 3, 60 (1884) incl. var. *edmondstoni*; *C. edmondstoni* Murbeck et Ostenfeld in *Bot. Not.* 246 (1896).

Icones :—Smith *Eng. Bot.* t. 473, as *C. latifolium*; *Fl. Dan.* t. 2963 (excl. seeds).

*Camb. Brit. Fl.* iii. *Plate 46*. (*a—e*) Fertile shoots. (*f*) Portion of stem (enlarged). (*g*) Leaf (enlarged). (*h*) Sepals (enlarged). (*i*) Petal (enlarged). (*j*) Fruit (enlarged). (*k*) Seeds (enlarged). Ben More, Assynt, Sutherlandshire (E. S. M.).

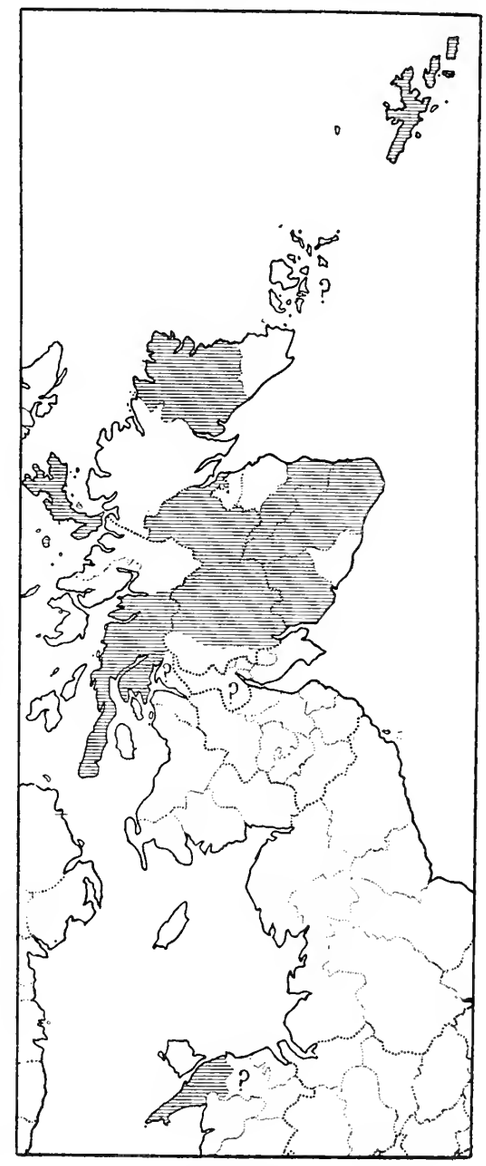
Exsiccata :—Don, 61, as *C. alpinum*; Fries, ix, 38, as *C. latifolium*; herb. Druce, 316, 672, 690, 2355, 2372.

Perennial. *Shoot* usually laxer than in *C. alpinum*, hairy though less so than in the British form of *C. alpinum*. *Leaves* elliptical, about 1 cm. long and 4 mm. broad. *Bracts* rather smaller than the leaves, herbaceous. *Inflorescence* solitary. *Flowers* less campanulate and more open than in *C. alpinum*, up to about 2 cm. in diameter; May to August. *Sepals* narrowly ovate, acute, with a scarious margin. *Petals* about twice as long as the sepals. *Capsule* about 1·5 times as long as the calyx, about 10—12 mm. long and 3—4 broad. *Seeds* reddish-brown, rugose and prominently so at the margin, nearly 3 mm. in diameter; larger than in *C. alpinum*; testa rather loose.

Bentham (*Cat. Pl. Pyr.* 69 (1826)) pointed out that the plant then known in this country as "*C. latifolium* Linn." was not the Linnaean plant. N. E. Brown (*Eng. Bot.* ed. 3, suppl., pp. 41 and 42 (1891)) regarded the British plant as "really *C. latifolium*, but a form with smaller seeds." My own view is that our plant is a species which forms a passage from *C. alpinum* to *C. latifolium*.

Plants from Snowdon, in Carnarvonshire, were identified by Professor Lange as his *C. arcticum* (*Journ. Bot.* xxv, 374 (1887)).

Mr F. N. Williams (in *Journ. Bot.* xxxvi, 386 (1898)) expresses the view that *C. arcticum* is a hybrid between two forms of *C. alpinum*. Not only, however, are the seed-characters against this view; but *C. arcticum* occurs in Zetland, as well as on some Scottish hills, where *C. alpinum* is unknown.



Map 20. Distribution of *C. arcticum* in Great Britain

(β) forma **nigrescens** Druce in Moss *Cambr. Brit. Fl.* iii, 48; *C. latifolium* Edmondston in *Phytologist* i, 497 (1843) non al.; *C. latifolium* var. *edmondstoni*[1] [Watson in *Lond. Cat. Brit. Pl.* 2 (1844) nomen;] Edmondston *Fl. Shetl.* 29 (1845); Babington *Man.* ed. 3, 54 (1851); N. E. Brown in *Eng. Bot.* ed. 3, suppl., 41 (1891); *C. latifolium* var. *glaciale* Babington *Man.* ed. 2, 56 (1847) non Gaudin; *C. latifolium* var. *nigrescens* [Edmondston ex Watson *Lond. Cat. Brit. Pl.* ed. 3, 3 (1850) nomen; Watson *Cyb. Brit.* 233 (1847) nomen;] Syme *Eng. Bot.* ii, 87 (1864); *C. alpinum* var. *edmondstoni* Hooker fil. *Stud. Fl.* ed. 3, 60 (1884); *C. arcticum* var. *edmondstoni* Beeby in *Scott. Nat.* 7, 24 (1887)!

Exsiccata:—Herb. Druce, 897.

Differs from the ordinary Alpine form in the following characters:—*Shoot* more tufted and more purplish. *Laminae* broader.

This local *forma* was first found by Thomas Edmondston, Junior, on Serpentine gravel near sea-level at Balta Sound, Unst, Zetland. It was described by him in 1845 (*loc. cit.*) under the name of *C. latifolium* L. That it differed specifically from the plant which was at that time known by this name among British botanists was maintained by Edmondston but controverted by Watson (in *Phyt.* i, 586).

"In 1897 and 1898 I brought home seeds and roots [of this *forma* from Zetland], and have the plants growing...in a mixture of Surrey soils. These plants have entirely lost their original colour, and have become completely green; so that it appears that the only character.....is merely temporary and due to habitat. The Serpentine gravels of Unst contain a number of minerals, notably chromate of iron, and the colour of the leaves may, probably, be due to the influence of one of them. The *Cerastium* is by no means the only plant growing on these hills which is affected in this way" (Beeby in *Bot. Exch. Club. Brit.* i, 568 (1899)). Watson, however, states that "the differences remain quite as strong in the plants raised from seeds near London (*Cyb. Brit.* 233 (1847)).

Local; damp Alpine grassland, rock-ledges, and talus, where the mineral content is high; Carnarvonshire (fide Lange), and central and northern Scotland, and (as forma *nigrescens*) Zetland; ascending to 1200 m.; not known in England or Ireland.

Faeröes, Iceland, Scandinavia, Spitzbergen; Greenland. Unknown in central Europe.

*C. alpinum* × *arcticum* (p. 46).

***C. arcticum* × *vulgatum*** Druce in Moss *Cambr. Brit. Fl.* iii, 48; *C. nigrescens* × *vulgatum* Druce in *Bot. Exch. Club Brit. Rep. for 1910*, ii, 498 (1911); × *C. richardsoni*[2] Druce *loc. cit.*

*Laminae* narrow, acute, less pubescent than *C. arcticum*. *Flowers* intermediate in size between the putative parents.

Carnarvonshire (Clogwyn, Snowdon). Not known elsewhere.

## 4. CERASTIUM VULGATUM. Mouse-ear Chickweed. Plates 47; 45

*Alsine hirsuta myosotis* Johnson *Merc. Bot.* 18 (1634); Ray *Syn.* ed. 3, 349 (1724).

**Cerastium vulgatum** L. *Fl. Suec.* ed. 2, 158 (1755); *Syst. Nat.* ed. 10, 1039 (1759); *Sp. Pl.* ed. 2, 627 (1762); non herb.; Hudson *Fl. Angl.* 175 (1762); Fries *Fl. Suec.* 52 (1817) excl. syn. L.; *C. viscosum* Linn. herb.!; Smith *Fl. Brit.* 497 (1800); *Eng. Fl.* ii, 330 (1824); non L. *Sp. Pl.*; *C. vulgare* Hartman *Skand. Fl.* 182 (1820); *C. triviale* Link *Enum. Hort. Berol.* i, 433 (1821) incl. *C. vulgatum* et *C. holosteoïdes*; Syme *Eng. Bot.* ii, 83 (1864); Rouy et Foucaud *Fl. France* iii, 206 (1896); *C. caespitosum* Gürke *Plant. Eur.* ii, 222 (1899) non Gilibert, nec Kitaibel (= *C. arvense*), nec Triana et Planchon, nec Malmgren (= *C. alpinum*).

Perennial. *Shoot* hairy, barren branches about 4—12 cm. long. *Leaves* sessile. *Laminae* oblong or elliptical or narrowly spathulate, spreading, obtuse or rather acute. *Inflorescence* lax at maturity, with several flowers. *Bracts* herbaceous. *Pedicel* of the lowest flower about 1·5 cm. long, much longer than the bracts or calyx, reflexed after flowering, 2—4 times as long as the calyx when mature. *Flowers* pentamerous, very variable in size, from about 0·8 to 1·5 cm. (or even rather more) in diameter; April to October. *Sepals* with scarious margins, rather acute, hairy. *Petals* varying from a little longer than the sepals to twice as long, divided about half-way. *Stamens* 5 + 5. *Capsule* curved, cylindrical, up to twice as long as the calyx. *Seeds* reddish, tuberculate.

Grenier (*op. cit.*, p. 39) has a var. *annuum* of this species; and Syme (*op. cit.* ii, p. 84) has a var. *pentandrum* which he declares is annual. Grenier's variety is not taken up in any continental flora I have consulted. Syme has no specimen of his var. *pentandrum* in his herbarium; and it is not known by tradition among the British botanists of to-day. Dr Moss informs me that he is frankly sceptical as to the existence of an annual variety of *C. vulgatum*, and suspects some confusion with one of the following species.

The following varieties are arranged to show the transition from *C. alpinum* to the common lowland forms of *C. vulgatum*, and thus on to the annual forms. On the continent of Europe, there are analogous intermediate forms connecting *C. alpinum* and *C. arvense*. The indigenous *C. arcticum* connects *C. alpinum* with *C. latifolium*. Thus a great aggregate of forms exists, circling round *C. alpinum*, which renders the genus very difficult to classify, and tends to make the arrangement of the species a matter of individual predilection.

[1] After Thomas Edmondston (1825—1846), of Buness, Zetland.
[2] After Richard Richardson (1663—1741), of North Bierly, Yorkshire.

(*a*) **C. vulgatum** var. **alpinum** Grenier *Monogr. Cerast.* 40 (1841); Grenier et Godron *Fl. France* i, 271 (1848); *C. fontanum* Baumgarten *Enum. Stirp. Transsilv.* i, 425 (1816); *C. triviale* var. *alpinum* Mertens und Koch *Fl. Deutschl.* iii, 336 (1831); *C. vulgare* var. *alpinum* Hartman *Skand. Fl.* ed. 4, 147 (1843); *C. triviale* race *fontanum* Rouy et Foucaud *Fl. France* iii, 207 (1896).

Exsiccata:—Hartz et Ostenfeld (*Pl. Faer.*), as *C. vulgare* var. *alpestre*; herb. Druce, 404, 6049; herb. Marshall, 1871; *Fl. Exs. Austr.-Hung.*, 55, as *C. macrocarpum.*

*Stems* rather stiff. *Petals* 6·5—8 mm. long, much exceeding the sepals. *Capsule* larger than in var. *hirsutum*. *Seeds* 0·8—1·1 mm., more strongly tuberculate than in var. *hirsutum.*

Not uncommon in Alpine localities, especially on damp, rocky cliffs, in Wales (e.g. Brecknockshire and Carnarvonshire) and Scotland (e.g. Perthshire, Forfarshire, Aberdeenshire, western Inverness-shire, and Sutherlandshire), ascending to 1067 m. in Perthshire.

Arctic and Alpine localities in Europe (incl. the Faeröes and Iceland), Asia, and North America; ascending to 2550 m. in Switzerland.

(*β*) var. **alpinum** forma **serpentini** Druce in Moss *Camb. Brit. Fl.* iii, 49; *C. triviale* var. *serpentini* Syme in *Bot. Exch. Club Rep. for 1876*, 11 (1878) nomen; N. E. Brown in *Eng. Bot.* ed. 3, suppl., 40 (1892).

*Leaves* as in var. *hirsutum*. *Flowers* larger than in var. *hirsutum*. *Sepals* with broad scarious margins. *Petals* 1·5 times as long as the sepals or rather more.

In the Isle of Stroma, Orkney, and on wet Serpentine gravels in Unst, Zetland.

(*b*) **C. vulgatum** var. **macrocarpum** Druce in Moss *Camb. Brit. Fl.* iii, 49; *C. macrocarpum* Schur in *Verh. Sieb. Ver.* 177 (1851); *Enum. Pl. Transsilv.* 120 (1866) non Boissier et Hohenacker; *C. longirostre* Wichura in *Jahres. Schles. Gesellsch.* 75 (1854).

Exsiccata:—Druce herb., 5818; Kerner in Herb. Mus. Brit.

Differs from var. *hirsutum* in the following characters:—*Leaves* sometimes very large (3 cm.). *Capsule* larger, 10—16 mm. long. *Seeds* darker, slightly larger. From var. *alpinum* it is distinguished by its shorter *petals* and larger *capsule.*

Maritime sands, grassy places among rocks, mountain screes and cliffs; from Jersey (the Quenvais) northwards to Ollaberry in Zetland; Ireland—Dingle, co. Kerry, and the Giant's Causeway, co. Antrim.

(*c*) **C. vulgatum** var. **holosteoïdes** Wahlenberg *Fl. Suec.* 289 (1826); Grenier *Monogr. Cerast.* 39 (1841); Syme *Eng. Bot.* ii, 84 (1864); *C. holosteoïdes* Fries *Fl. Suec.* 52 (1817)!

Icones:—Reichenbach *Icon. Crit.* t. 181, fig. 317—318, as *C. holosteoïdes.*

Exsiccata:—Fries, xv, 42, as *C. vulgatum* var. *holosteoïdes*; herb. Druce, 4918.

*Shoot* large, stout, lax, 1—4 dm. *Stem* with a line of hairs, changing its position at each node (cf. *Stellaria media*), otherwise glabrous. *Bracts* ciliate. *Pedicels* with hairs all round. *Sepals* glabrescent or with a few long hairs. *Petals* large. *Capsule* much exserted.

This is possibly the plant referred to by Dillenius (in Ray's *Syn.* ed. 3, 349 (1724)) "ad ripas Thamesis prope Battersea cum foliis glabris inven. D. Doody."

On banks of rivers in places which are occasionally flooded; Hampshire, ? Surrey, Cheshire, Durham, Northumberland, Wigtonshire, Kirkcudbrightshire, Stirlingshire, Perthshire.

Scandinavia, Denmark, Germany, France, central Europe.

(*d*) **C. vulgatum** var. **hirsutum** Fries *Fl. Suec.* ed. 2, 125 (1828); *C. viscosum* L. herb. non *Sp. Pl.*; *C. triviale* var. *hirsutum* Neilreich *Fl. Nied.-Oest.* 798 (1859); Rouy et Foucaud *Fl. France* iii, 206 (1896); *C. triviale* var. *genuinum* Syme *Eng. Bot.* ii, 83 (1864); *C. vulgatum* var. *typicum* Beck *Fl. Nied.-Oesterr.* i, 367 (1890).

Icones:—Smith *Eng. Bot.* t. 790, as *C. viscosum*; Curtis *Fl. Lond.* i, 95, as *C. vulgatum*; *Fl. Dan.* t. 1645, as *C. vulgatum*; Reichenbach *Icon. Crit.* t. 245, figs. 402, 403, as *C. triviale*; *Icon.* v, t. 229, fig. 4972, as *C. triviale.*

*Camb. Brit. Fl.* iii. *Plate 47.* (*a*) Flowering shoot. (*b*) Fruit. (*c*) Capsule. Worcestershire (E. W. H.).

Exsiccata:—Billot, 2639, as *C. vulgatum*; Fellman, 64, as *C. vulgatum*; Fiori, Béguinot, et Pampanini (*Fl. Ital.*), 810, as *C. triviale*; Fries, x, 40 (partim), as *C. vulgatum*; Schneider (*Pl. Hung.*), 1204, as *C. vulgatum*; Woloszczak (*Fl. Pol. Exsicc.*), 807, as *C. vulgatum*; *Herb. Fl. Ingric.* i, 105, as *C. vulgatum*; *Rel. Maill.* 939, as *C. vulgatum.*

In the Linnaean herbarium there is a specimen of *C. vulgatum* var. *hirsutum* named *C. viscosum.*

Perennial. *Shoot* thickly clothed with eglandular hairs all round (i.e., not confined to one or two lines), 5—50 cm. *Flowers* about 6—7 mm. in diameter, pentamerous. *Sepals* pubescent. *Petals* about as long as the sepals, or a little longer. *Stamens* usually 10. *Seeds* 0·6—0·8 mm.

This is the common form of the species. A large-flowered form occurs in meadows, as, for example, in Hampshire.

(β) var. **hirsutum** forma **nemorale** Druce in Moss *Camb. Brit. Fl.* iii, 50; *C. triviale* var. *nemorale* Uechtritz in *Oesterr. Bot. Zeit.* xviii, 73 (1868); Rouy et Foucaud *Fl. France* iii, 207 (1896); non *C. nemorale* Bieberstein.

*Shoot* robust, 30—50 cm. *Leaves* larger, more or less hairy, sometimes with glandular hairs. *Peduncles*, *pedicels*, and *calices* usually with glandular hairs. *Capsule* rather longer than the calyx.

A plant collected by Sir J. D. Hooker in 1904 at "the Camp, Sunningdale, not on made ground, which was 2 feet 6 inches [75 cm.] high," in Herb. Kew, should be placed here.

The var. *elongatum* Grenier *Monogr. Cerast.* 39 (1841) appears to differ chiefly in its larger petals.

Fen banks, alluvial meadows, damp sandy-peaty soils; locally common.
Europe.

(γ) var. **hirsutum** forma **glandulosum** Druce in Moss *Camb. Brit. Fl.* iii, 50; *C. viscosum* var. *glandulosum* Boenninghausen *Prodr. Fl. Monast.* 13 (1824); *C. triviale* var. *glandulosum* Reichenbach *Fl. Germ. Excurs.* 796 (1833); *C. vulgatum* var. *glandulosum* Grenier *Monogr. Cerast.* 39 (1841); *C. vulgare* subsp. *triviale* forma *glandulosum* Murbeck in *Bot. Notiser* 253 (1898).

Exsiccata:—von Hayek (*Fl. Stir.*), 333, as *C. caespitosum* var. *glandulosum*; Druce herb. x, 63.

*Shoot* 1—3 dm. *Leaves* oblong. *Bracts* with a narrow, scarious margin. *Peduncles*, *pedicels*, and *sepals* with gland-tipped hairs. *Petals* 5·0—6·5 mm. *Seeds* 0·6 mm.

A smaller, more slender, and less diffuse plant than forma *nemorale*. Possibly a hybrid of *C. viscosum* and *C. vulgatum*.

On the Coralline Oolite, Headington and near Wheatley in Oxfordshire.
Austria.

(δ) var. **hirsutum** forma **obtusum** Druce in Moss *Camb. Brit. Fl.* iii, 50; *C. vulgatum* var. *obtusum* Druce in *Bot. Exch. Club Brit. Is. Rep. for 1907*, 256 (1908).

*Shoot* rigid, tall, 30—35 cm. *Inflorescence* dense. *Sepals* very short, obtuse. *Capsule* short, 6 mm. *Seeds* light brown, 0·6 mm.

St Aubyn's, Jersey, in dry places, growing with the typical form of var. *hirsutum*. Not known elsewhere.

*C. vulgatum* occurs in pastures and meadows, by tidal streams, on sea-shingle and sand-dunes, on grassy chalk downs, on maritime and mountain cliffs and talus, on walls, among mine refuse, in arable and fallow fields, by waysides and in waste places, preferring well-drained soils; a ubiquitous species common throughout the British Islands, ascending to nearly 1200 m. in Scotland and over 1000 m. in Ireland.

Faeröes, Iceland, Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 2550 m. in Switzerland), Russia, southern Europe; Asia; Africa; America (not indigenous).

*C. alpinum* × *vulgatum* (p. 47); *C. arcticum* × *vulgatum* (p. 48).

## Series ii. *Viscosa*

**Viscosa** Moss *Camb. Brit. Fl.* iii, 50; *Fugacia* Fenzl in Ledebour *Fl. Ross.* i, 403 (1842); *Annuae* Schultz in *Arch. Fl.* i, 24 (1842).

For characters, see page 44.

### British species of *Viscosa*

5. **C. viscosum** (p. 51). *Inflorescence* more or less densely crowded. *Bracts* all herbaceous. *Pedicels* erect, shorter than the calyx. *Flowers* usually pentamerous. *Petals* a little longer than the sepals, narrow, hairy at the base. *Stamens* 10.

6. **C. tetrandrum** (p. 52). *Inflorescence* rather lax. *Bracts* all herbaceous. *Pedicels* usually erect, longer than the calyx. *Flowers* pentamerous or (usually) tetramerous. *Petals* rather narrow, about as long as the sepals, glabrous. *Stamens* 5 or (usually) 4.

7. **C. pumilum** (p. 53). *Inflorescence* rather lax. *Upper bracts* with narrow, scarious margins. *Pedicel* about as long as the calyx, reflexed between flowering and fruiting. *Petals* rather deeply notched, glabrous. *Stamens* 5.

8. **C. semidecandrum** (p. 54). *Inflorescence* rather lax. *Upper bracts* with broad scarious margins. *Pedicels* 1·5—4 times as long as the calyx, reflexed between flowering and fruiting. *Petals* narrower and less deeply notched than in *C. pumilum*, glabrous. *Stamens* usually 5.

## 5. CERASTIUM VISCOSUM. Plate 48

*Alsine myosotis humilior et rotundo folio* Merrett *Pinax* 6 (1666); *A. hirsuta latifolia praecocior*[1] Ray *Syn.* ed. 3, 348 (1724); *A. hirsuta altera viscosa* Ray *Cat. Angl.* 16 (1670).

**Cerastium viscosum** L. *Sp. Pl.* 437 (1753); *Fl. Suec.* ed. 2, 158 (1755); *Syst. Nat.* ed. 10, 1039 (1759); *Sp. Pl.* ed. 2, 627 (1762); non herb.; Hudson *Fl. Angl.* 175 (1762); Thuillier *Fl. Env. Paris* éd. 2, 226 (1799) incl. *C. glomeratum*; Grenier *Monogr. Cerast.* 25 (1841); Schultz *Arch. Fl.* i, 23 (1842); *C. vulgatum* Linn. herb. non *Sp. Pl.*; Smith *Fl. Brit.* 496 (1800)!; *Eng. Fl.* ii, 330 (1824); non L.; Syme *Eng. Bot.* ii, 82 (1864); Rouy *Fl. France* iii, 212 (1896).

Icones :—Smith *Eng. Bot.* t. 789, as *C. vulgatum*; Curtis *Fl. Lond.* i, 94, as *C. viscosum*; *Fl. Dan.* t. 1931, as *C. viscosum*; Reichenbach *Icon. Crit.* iii, t. 233, figs. 385, 386, as *C. vulgatum*; *Icon.* v, t. 229, fig. 4970, as *C. vulgatum.*

*Camb. Brit. Fl.* iii. *Plate 48.* (*a*) Plant in flower. (*b*) Portion of stem (enlarged). (*c*) Flower (enlarged). (*d*) Calyx (enlarged). (*e*) Capsules (one enlarged). Huntingdonshire (E. W. H.).

Exsiccata :—Billot, 2638, as *C. viscosum*; Bourgeau (*Pyr. Esp.*), 213, as *C. glomeratum*; Fries, xiv, 41, as *C. viscosum*; Todaro, 1021, as *C. viscosum*; 1022, as *C. viscosum* var. *glomeratum*; *Fl. Exs. Austr.-Hung.* 3248, as *C. viscosum*; *Rel. Maill.* 930, 938, as *C. glomeratum.*

Annual. *Shoot* strongly viscous with glandular hairs, 6—24 cm., branched at the base, lateral branches ascending. *Laminae* oblong-elliptical, almost connate below, obtuse to subacute, about 1·5—2·0 cm. long and 5—8 mm. broad. *Inflorescence* more or less densely crowded with flowers. *Bracts* all green, lowest pair like the leaves only a little smaller, upper ones more ovate. *Pedicels* shorter than the calyx when in flower, in fruit shorter than the capsules. *Flowers* usually pentamerous, rarely tetramerous; April to September. *Sepals* ovate-lanceolate, with narrow white margins, very acute. *Petals* 1·2—1·3 times as long as the sepals, not contiguous, apical notch deeper than in *C. semidecandrum*, lobes oblong and but little spreading. *Stamens* 10; filaments glabrous. *Capsule* about twice as long as the calyx, curved. *Seeds* pale brown, compressed, punctate.

Smith (*Eng. Fl.* ii, 331 (1824)) states that much misconception has prevailed among botanists concerning *C. vulgatum* L. and *C. viscosum* L. I submit that the misconception is really Smith's. In my allocation of the names in question, I am following the original descriptions of Linnaeus, and using the names in the same way as pre-Smithian botanists, and Fries, and others. Smith inverted the names, being (in my judgment) misled by the plants of the Linnaean herbarium, which are to be allocated as Smith states! Some botanists have endeavoured to get over the difficulty by adopting the name of *C. caespitosum* Gilibert *Fl. Lituan.* v, 159 (1782) for the plant I name *C. vulgatum* L.; but this overlooks the fact that Gilibert, in the work cited, has a *C. vulgatum* and a *C. viscosum* as well as his *C. caespitosum* which seems to be a third species. Some botanists who prefer to adopt what they regard as unambiguous names use *C. triviale* for *C. vulgatum* and *C. glomeratum* for *C. viscosum.* However, it is clear to me that, although Linnaeus mixed his specimens, the descriptions in the *Spec. Plant.* (ed. 1 and ed. 2) and the *Fl. Suecica* belong to the plants to which the names are here attached.

Linnaeus has both the following varieties in his herbarium; and both of them seem to be distributed throughout eastern England, and elsewhere.

(*β*) subvar. **apetalum** Druce in Moss *Camb. Brit. Fl.* iii, 51; *C. apetalum* Dumortier *Comm. Bot.* 47 (1822); *C. glomeratum* var. *apetalum* Mertens und Koch *Deutschl. Fl.* ed. 3, iii, 339 (1831); Babington *Man.* ed. 2, 54 (1847); N. E. Brown in *Eng. Bot.* ed. 3, suppl. 39 (1891); *C. glomeratum* forma *apetalum* Murbeck in *Bot. Not.* 256 (1898); *C. viscosum* var. *apetalum* Druce *Fl. Berksh.* 91 (1897).

Exsiccata :—Herb. Druce, 315, 1029, 1158.

A dwarfer form. *Shoot* 2—10 cm. *Flowers* cleistogamous. *Petals* rudimentary or absent. *Stamens* usually about 5. *Capsule* smaller, not quite as long as the calyx.

There is an interesting note on this form in the *Journ. Bot.* xxxviii, pp. 276—277 (1900) by C. E. Britton.

Surrey, Berkshire, Glamorganshire, Cambridgeshire, Huntingdonshire, Staffordshire, North Riding of Yorkshire, Perthshire, and doubtless elsewhere.

Denmark, Germany, Belgium, France, central and southern Europe, Russia.

(*a*) **C. viscosum** var. **elongatum** Druce in Moss *Camb. Brit. Fl.* iii, 51; *C. viscosum* Thuillier *Fl. Env. Paris* éd. 2, 226 (1799); *C. glomeratum* var. *corollinum* subvar. *elongatum* Rouy et Foucaud *Fl. France* iii, 213 (1896).

Exsiccata :—Herb. Druce, 726, 6592.

*Inflorescence* laxer than in var. *confertum.* *Pedicels* longer.

Widely distributed from the Channel Isles northwards at least to Buckinghamshire, Bedfordshire, and Cambridgeshire.

France, and doubtless elsewhere.

Cited by Fries (*loc. cit.*) for his *C. glutinosum*; but see Druce and Vines *The Dillenian Herbaria* 107 (1907).

(*b*) **C. viscosum** var. **confertum** Druce in Moss *Camb. Brit. Fl.* iii, 52; *C. glomeratum* Thuillier *Fl. Env. Paris* éd. 2, 226 (1799); *C. glomeratum* var. *corollinum* subvar. *confertum* Rouy et Foucaud *loc. cit.*

Exsiccata:—Herb. Druce, 104, 516.

*Inflorescence* very dense. *Pedicels* very short.

This is the usual form of the species: its leaves are sometimes very broad.

A curious, monstrous form of this species, with the sepals, petals, and carpels changed to leaves, and with hairy filaments and unchanged anthers, was described by Babington (in *Gard. Chron.* 557 (1844)). The plant occurred at Tintern, Monmouthshire; specimens are preserved in Herb. Univ. Cantab.

Locally common throughout the British Isles, especially in lowland districts; damp waste places, grassy heaths and cliffs, walls, waysides, drives in woods, and arable land; showing a preference for light and not very calcareous soils; ascending to over 650 m. in Scotland and to over 500 m. in Ireland.

Faeröes, Iceland, Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 1400 m. in the Tyrol), Russia, southern Europe; northern Africa; Asia; America (not indigenous).

## 6. CERASTIUM TETRANDRUM. Plate 49

**Cerastium tetrandrum** Curtis *Fl. Lond.* i, 93 (between 1791 and 1796)[1]; Smith *Fl. Brit.* 498 (1800)!; Babington in *Mag. Zool. and Bot.* ii, 201 (1838) incl. *C. pedunculatum*, t. 6, p. 200, et incl. *C. atrovirens*, t. 9, p. 317; Syme *Eng. Bot.* ii, 78 (1864); *Sagina cerastioïdes* Dickson in *Trans. Linn. Soc.* ii, 343 (1794)!; Smith *Eng. Bot.* no. 166 (1794); *C. pumilum* var. *tetrandrum* Grenier *Monogr. Cerast.* 33 (1841); *C. pumilum* Schultz *Arch. Fl.* 23 (1842); Grenier et Godron *Fl. France* i, 269 (1848); non Curtis; *C. pumilum* race *tetrandrum* Rouy et Foucaud *Fl. France* iii, 217 (1896).

Icones:—Curtis *Fl. Lond.* i, 93; Smith *Eng. Bot.* t. 166, as *Sagina cerastioïdes*; *Fl. Dan.* t. 2117; Reichenbach *Icon.* v, t. 227, fig. 4954, as *Esmarchia cerastioides*, et t. 228, fig. 4969 (left-hand figure) as *C. atrovirens.*

*Camb. Brit. Fl.* iii. *Plate 49.* (*a, b, c*) Whole plants. (*d*) Upper bract (enlarged). (*e*) Sepal (enlarged). (*f*) Petal (enlarged). (*g*) Flower (enlarged). (*h*) Fruit (enlarged) (E. W. H.). (*i*) Whole plant. (*j*) Upper bract (enlarged). (*k*) Sepal (enlarged). (*l*) Fruits (one enlarged). (*m*) Capsule (enlarged). Jersey (E. W. H.). (*n*) Whole plant. (*o*) Sepals (enlarged). (*p*) Flower (enlarged). (*q*) Capsule (enlarged). Somerset (E. W. H.).

Exsiccata:—Dickson, x, 4, as *Sagina cerastioïdes*; Don, 60; Fries, xv, 44; Schultz (*H. N.*), vii, 620; (*Fl. Gall. et Germ.*), 624; *Rel. Maill.* 407, 407 a.

Annual, allied to *C. viscosum* but more of an ephemeral plant. *Shoot* very viscid with glandular hairs, usually branched at the base, lateral branches procumbent or ascending, 2—22 cm. *Leaves* of the rosette less numerous and less compact than in *C. pumilum*, soon withering; *laminae* subspathulate; upper ones oblong to elliptical, obtuse or rather acute, recurved at the tips. *Inflorescence* rather lax. *Bracts* all leaf-like, without any scarious margin, shorter than the pedicels. *Pedicels* 1·5—4 times as long as the calyx, usually erect, not bent at or near the top. *Flowers* usually tetramerous, less often pentamerous, about 7—9 mm. in diameter; April to July. *Sepals* acute, margins scarious. *Petals* not contiguous, oblong, rather deeply notched at the apex; lobes oblong, nearly parallel, about as long as the sepals. *Stamens* 4—5. *Capsule* slightly curved, usually about 1·5 times as long as the calyx. *Seeds* brown, about 0·6 mm. long, punctulate.

The earliest British record is by Dickson (*loc. cit.*); but there are specimens in herb. Dillenius at Oxford labelled "an viscosa found by Dr Manninghan on ye coast of Sussex est praecox" which are the earliest I have seen.

(*a*) forma **luxurians** Druce in Moss *Camb. Brit. Fl.* iii, 52.

*Shoot* diffuse, large, 25 cm.; internodes 4·5 cm. *Lower leaves* broadly ovate, large, 2·5 cm. long and 1·0 broad. *Sepals* with narrow scarious margins. *Capsule* short, straight.

Coasts of Cornwall and Glamorganshire, and doubtless elsewhere.

[1] The exact date of the publication of *C. tetrandrum* and *C. pumilum* is not known, but was probably about 1794. The plates of the six fascicles of Curtis's *Fl. Lond.* were issued in most cases in numbers and were undated. On the completion of each fascicle, an index was supplied in which the plants were numbered for guidance in binding. Hitherto I have been unable to meet with a copy with the fascicles bound up in the order of their publication. As no clue to the date of publication is given on the plates, it is only from other sources that their approximate dates can be obtained (see *Journ. Bot.* xix, 310 (1881); xxxiii, 112 (1895)). From the reference to *C. pumilum* in Withering's *Arr.* ed. 3, 435 (1796), Curtis's plate of the plant probably appeared before that time.

(β) forma **atrovirens** Druce in Moss *Camb. Brit. Fl.* iii, 53; *C. atrovirens* Babington *op. cit.* ii, 317, t. 9 et t. 9 (1838).

*Shoot* dark green. *Leaves* ovate or oblong (not elliptical-oblong). *Peduncles* sometimes long. *Pedicels* ascending or erect when in fruit. *Seeds* rather large.

From the Channel Isles to Aberdeenshire.

(γ) forma **pedunculatum** Druce in Moss *Camb. Brit. Fl.* iii, 53; *C. pedunculatum* Babington *op. cit.* 200, t. 6 (1838); *C. tetrandrum* var. *genuinum* Rouy et Foucaud *Fl. France* iii, 217 (1896) non Grenier.

*Laminae* ovate or oblong. *Pedicels* 2—4 times as long as the calyx, erect. *Bracts* slightly membranous. *Seeds* small.

On sandy ground; Isle of Wight, Essex (Babington *loc. cit.*).

(δ) forma **congestum** Druce in Moss *Camb. Brit. Fl.* iii, 53.

*Shoot* densely caespitose, 1—2 cm. high and 5—6 across. *Flowers* very numerous. *Capsules* narrowly cylindrical, longer than the calyx.

Differs from forma *zetlandicum* by its smaller and narrower capsules, and by its more congested habit.

Caithness-shire; co. Galway.

(ε) forma **zetlandicum** Druce in Moss *Camb. Brit. Fl.* iii, 53; *C. tetrandrum* var. *zetlandicum* Murbeck in *Bot. Notiser* 257 (1898).

Exsiccata :—J. Hartz and C. H. Ostenfeld in Herb. Kew.

*Shoot* rigid. *Internodes* short. *Inflorescence* rather condensed.

Montrose in Forfarshire, Zetland (Murbeck *loc. cit.*).

The Faeröes.

(ζ) subvar. **dunense** Druce in Moss *Camb. Brit. Fl.* iii, 53; *C. tetrandrum* var. *dunense* Salmon in *Journ. Bot.* li, 17 (1913)!

Icones :—*Camb. Brit. Fl.* iii. *Plate* 49, *i—m.*

Exsiccata :—Schultz (*H.N.*), vii, 620, as *C. tetrandrum* (*fide* C. E. Salmon *loc. cit.*).

Usually larger in all its parts (especially the *calyx* and *capsule*) than the other English forms.

Sandy coasts of Guernsey and Jersey.

France (Normandy).

Sandy sea-shores, sand-dunes, ledges of sea-cliffs, and in rocky places and on dry banks near the sea; rather frequent on British coasts, from the Channel Isles to Zetland, and round Ireland; rarely inland, as in Berkshire, Wiltshire (at 270 m. on White Horse Down), and Herefordshire (adventitious), and in county Mayo (shores of Lough Cong and south of Lough Mask on limestone).

Faeröes, southern Scandinavia, Denmark, Germany, Holland, Belgium, France, southern Europe (Spain, Corsica, Sardinia, Cyprus).

## 7. CERASTIUM PUMILUM. Plate 50

**Cerastium pumilum** Curtis *Fl. Lond.* i, 92 (between 1791 and 1796)[1]; Babington *Man.* 53 (1843); Syme *Eng. Bot.* ii, 79 (1864); Townsend in *Journ. Bot.* xv, 36 (1877)!; *C. semidecandrum* var. β Smith *Eng. Fl.* ii, 331 (1824)!; *C. semidecandrum* var. *glutinosum* [Reichenbach *Fl. Germ. Excurs.* 795 (1832)?]; Babington in *Mag. Zool. and Bot.* ii, 199 (1838); *C. tetrandrum* var. *pumilum* Hooker fil. *Stud. Fl.* ed. 3, 59 (1884).


Map. 21. Distribution of *C. pumilum* in England

Icones :—Curtis *Fl. Lond.* i, t. 92; Syme *Eng. Bot.* t. 219; Reichenbach *Icon.* v, t. 228, fig. 4969 ("is quite our English *C. pumilum*" Townsend *loc. cit.*), excl. left-hand figure, as *C. pumilum* and *C. pumilum* var. *viscarium*.

*Camb. Brit. Fl.* iii. *Plate 50.* (*a—c*) Whole plants. (*d*) Upper part of a large plant. (*e*) Bracts (enlarged). (*f*) Sepals (enlarged). (*g*) Petals (enlarged). (*h*) Flowers (enlarged). (*i*) Capsule and calyx (enlarged). (*j*) Capsules (enlarged). Somerset (E. S. M.).

[1] See footnote, page 52.

Ephemeral; closely allied to *C. semidecandrum*. *Shoot* with glandular hairs, branched at the base (except in the dwarf forms), lateral branches ascending or procumbent, rather dark green, often more or less purplish, 2—15 cm. long. *Leaves* forming a compact tuft which lasts into the flowering stage, spathulate to elliptical. *Inflorescence* rather lax, with about 3—15 flowers. *Bracts*—lowest pair wholly green, upper ones with a narrow scarious to subscarious margin. *Pedicels* about as long as the calyx, persistently curved at the top, reflexed from the base after flowering, ultimately erect except at the top. *Flowers* pentamerous, comparatively conspicuous, about 3—6 mm. in diameter; April to mid-May, the whole plant dead by mid-June or late-June. *Sepals* narrowly ovate, with a white scarious margin above. *Petals* about as long as the sepals, limb narrowly obovate, claw very short or absent, not contiguous, lobes nearly parallel, thicker and rather more deeply notched than in *C. semidecandrum*, of equal thickness throughout. *Stamens* 5. *Capsule* 1·2 to 1·5 times as long as the calyx, slightly curved. *Seeds* small (0·5—0·6 mm.), dark brown, with minute and acute papillae.

Open, dry, sunny, and often bare situations on calcareous grassland, calcareous grassy banks, floors of limestone or chalk quarries and on the quarry-*débris*, and on calcareous cliffs; local, from Devonshire and Kent northwards to Gloucestershire and Oxfordshire and with an outlying station in Suffolk; ascending to 230 m.

Europe, and perhaps elsewhere; but foreign distribution doubtful as British and continental botanists are not agreed as to the limits of the species.

## 8. CERASTIUM SEMIDECANDRUM. Plate 51

*Alsine hirsuta minor* C. Bauhin *Pinax* 251 (1671); Johnson *Iter Cant.* 3 (1629); *C. hirsutum minus parvo flore* Ray *Syn.* ed. 3, 348, t. 15, fig. 1 (1724)!

**Cerastium semidecandrum** L. *Sp. Pl.* 438 (1753); Smith *Fl. Brit.* 497 (1800)!; Grenier *Monogr. Cerast.* 28 (1841); Schultz in *Arch. Fl.* 24 (1842); Syme *Eng. Bot.* ii, 81 (1864); Rouy et Foucaud *Fl. France* iii, 219 (1896).

Annual. *Shoot* usually pale green, with glandular hairs, branched at the base, lateral branches procumbent or ascending, about 2—20 cm. long, simple in the starved forms. *Laminae* subspathulate to elliptical. *Inflorescence* rather lax. *Bracts* lowest pair herbaceous and smaller than the leaves, upper ones with broad white scarious margins. *Pedicels* 1·5—4·0 times as long as the calyx in the fruiting state, reflexed after flowering, ultimately erect. *Flowers* usually pentamerous, 5—7 mm. in diameter; mid-March to early July, the first species to come into flower. *Sepals* 5, very acute, with broad, white, scarious margins, with gland-tipped hairs on the back. *Petals* 5, about as long as the sepals or a little shorter, not contiguous, narrow, apical notch small and rather shallow. *Stamens* usually 5, antisepalous. *Stigmas* 5, antipetalous. *Capsule* about 1·2—2·0 times as long as the calyx, slightly curved. *Seeds* small (0·4—0·5 mm. long), pale brown, punctulate.

(*a*) **C. semidecandrum** var. **friesianum** Babington in *Mag. Zool. Bot.* ii, 199 (1838); *C. semidecandrum* var. *genuinum* Rouy et Foucaud *Fl. France* iii, 219 (1896).

Icones:—Smith *Eng. Bot.* t. 1630; Curtis *Fl. Lond.* i, 93; *Fl. Dan.* t. 1212; Reichenbach *Icon.* v, t. 228, fig. 4968.

*Camb. Brit. Fl.* iii. *Plate 51.* (*a*, *b*) Whole plants. (*c*) Bracts (enlarged). (*d*) Sepals (enlarged). (*e*) Flowers. (*f*) Flower (enlarged). (*g*) Ovary. (*h*) Capsule and persistent calyx (enlarged). Huntingdonshire (E. W. H.).

Exsiccata:—Billot, 12, as *C. semidecandrum*; Dickson, viii, 11, as *C. semidecandrum*; Don, 59, as *C. semidecandrum*; Ehrhart herb. 95, as *C. semidecandrum*; Fries, i, 39, as *C. semidecandrum* var. *viscosum*; Reichenbach 387 (a broad-leaved form), as *C. semidecandrum*; Schultz (*Fl. Gall. et Germ.*), 15 bis, as *C. semidecandrum* (*H. N.*), xvi, 1536; Thielens et Devos, iv, 306, as *C. semidecandrum*; Wirtgen, xiii, 736, as *C. semidecandrum* forma *procumbens*; *Rel. Maill.* 936, as *C. semidecandrum.*

*Shoot* not very strongly hairy or glandular-hairy, especially below. *Pedicels* of the lowest flower 1—2 times longer than the calyx.

This is the common form of the species.

(*b*) **C. semidecandrum** var. **glandulosum** Koch *Syn.* 121 (1837) excl. syn. Fries[1]; ed. 2, 133 (1845); *C. varians* var. *pellucidum* Cosson et Germain *Fl. Env. Paris* 38, *Atlas*, t. 5, fig. 7—9[2] (1845) excl. syn. Smith; *C. semidecandrum* var. *pellucidum* Rouy et Foucaud *Fl. France* iii, 220 (1896).

[1] In the second edition of his *Synopsis*, Koch omitted the synonym *C. glutinosum* Fries to which he gave specific rank.

[2] This represents a plant intermediate between var. *friesianum* and var. *glandulosum.*

Exsiccata :—Herb. Druce, 468, 7804; *Rel. Maill.* 937, as *C. semidecandrum.*

*Shoot* much taller than in var. *friesianum*, densely glandular at least above, yellowish green *Leaves* rather larger. *Pedicels* 3—4 times as long as the calyx. *Petals* a little shorter than the calyx. *Capsules* 1·5—2·0 times as long as the calyx. *Seeds* minutely and obtusely punctulate.

Dry, sandy or calcareous-sandy, loose soils, including sand-dunes; local, as in Kent, Suffolk, Berkshire, Oxfordshire, and doubtless elsewhere.

Germany, France, Austria, southern Russia, Sicily.

Sand-dunes and grassy places near the sea, sea-cliffs, dry grassy heaths and commons, broken limestone ground, calcareous grassland, dry banks and walls, arable land; preferring dry, light, and sandy, and calcareous soils; locally abundant in lowland situations from the Channel Isles, Cornwall, and Kent to Caithness-shire; more local in Ireland; a lowland species, ascending to 350 m. in Derbyshire and co. Derry.

Southern Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; northern Africa; southwestern Asia; North America (not indigenous).

## Section II. *DICHODON*

**Dichodon** Koch *Syn.* 118 (1837) sub *Stellaria*; Boissier *Fl. Orient.* i, 713 (1867); Rouy et Foucaud, *Fl. France* iii, 222 (1896).

This section connects the two genera *Cerastium* and *Stellaria.*

For characters, see page 43. Only British species :—*C. cerastioïdes.*

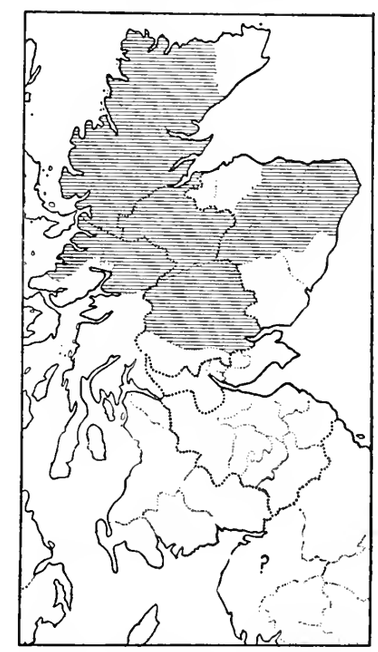
## 9. CERASTIUM CERASTIOÏDES. Plate 52

**Cerastium cerastioïdes** Britton in *Mem. Torr. Bot. Club* v, 150 (1894); *Stellaria cerastioïdes* L. *Sp. Pl.* 422 (1753)!; Smith *Fl. Brit.* 477 (1800)!; *C. lapponicum* Crantz *Inst.* ii, 402 (1766); H. and J. Groves in Babington *Man.* ed. 9, 66 (1904); *C. trigynum* Villars *Prospect.* 48 (1779); *Hist. Pl. Dauph.* iii, 645, t. 46 (1789); Syme *Eng. Bot.* ii, 90 (1864); Rouy et Foucaud *Fl. France* iii, 223 (1896); *C. refractum* Allioni *Fl. Pedem.* ii, 117 (1785).

Icones :—Smith *Eng. Bot.* t. 911, as *Stellaria cerastioïdes*; *Svensk Bot.* t. 744, as *St. cerastioïdes*; Reichenbach *Icon.* v, t. 221, fig. 4915, as *Dichodon cerastioïdes.*

*Camb. Brit. Fl.* iii. *Plate 52.* (*a*) Plant in flower. (*b*) Petal. (*c*) Ovaries (one enlarged). *a—c* from Switzerland (E. W. H.). (*d*) Shoot with ripening fruit. (*e*) Barren branch. (*f*) Portion of stem (enlarged). (*g*) Fruit. (*h*) Seeds (enlarged). *d—h* from Ben Avon (E. S. M.).

Exsiccata :—Billot, 3538, as *Stellaria cerastioïdes*; Bourgeau (*Pyr. Esp.*), 232, as *St. cerastioïdes*; Dickson, ii, 11, as *St. cerastioïdes*; Fellman, 56, as *St. cerastioïdes*; Fiori, Béguinot, et Pampanini (*Fl. Ital.*), 45, as *C. trigynum*; Fries, vii, 35, as *C. trigynum*; Reichenbach, 1096, as *St. cerastioïdes.*



Map 22. Distribution of *C. cerastioïdes* in Great Britain

Perennial. *Rhizome* slender, rooting freely. *Shoot* diffuse, much branched at the base. *Branches* procumbent to erect, usually glabrous except for lines of hairs alternating in position at each node (cf. *Stellaria media* and its allies), rarely hairy or glandular-hairy. *Laminae* narrowly spathulate or elliptical or oblong, rather obtuse, usually about 1 cm. long or rather less and 1·5—3·0 mm. broad, usually glabrous, rarely hairy. *Inflorescence* (in the British form) with 1—3 flowers. *Bracts* herbaceous, lowest pair leaf-like, upper ones much smaller and more or less acute. *Pedicels* hairy or glandular-hairy. *Flowers* showy; July and August. *Sepals* narrowly ovate, with a white margin, keel hairy or glabrous. *Petals* about twice as long as the sepals, bifid, the cleft less and often much less than half the length of the petal. *Stigmas* about as long as the ovary. *Capsule* broadly cylindrical, 1·2—2·0 times as long as the calyx. *Seeds* punctate especially round the margin, rather pale brown, about 1 mm. long.

A record of this plant by Samuelsson (in *Bull. Geol. Instit. Upsala* x, 232 (1910)), for Cross Fell, Cumberland, at an altitude of 450 m., requires confirmation.

(β) subvar. **nivale** Druce in Moss *Camb. Brit. Fl.* iii, 56; *Stellaria cerastioïdes* var. *nivale* Babington *Man.* 47 (1843)!

Icones :—Cf. *Fl. Dan.* t. 92.

Exsiccata :—Herb. Druce, 947.

*Shoot* hairy.

Very rare; on the Cairngorm group in Aberdeenshire, Banffshire, and Inverness-shire. Not definitely recorded elsewhere.

Very local, near alpine springs and margins of rills, both in damp grassy and stony places; on the mountains of Breadalbane and Rannoch in Perthshire, in Aberdeenshire, Banffshire, Inverness-shire, western Ross-shire and Sutherlandshire, ascending to 1300 metres on Ben Nevis.

Faeröes, Iceland, Scandinavia, mountains of central Europe as in France, Switzerland (ascending to 2920 m.), and Austria, mountains of southern Europe; Asia; North America including Greenland.

## Genus 9. Stellaria

**Stellaria** L. *Sp. Pl.* 421 (1753) et *Gen. Pl.* ed. 5, 193 (1754) emend.; Bentham and Hooker *Gen. Pl.* i, 149 (1862); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 79 (1889). [*Alsine* Tournefort *loc. cit.*, partim;] L. *loc. cit.*, partim.

Map 23. Distribution of *S. aquatica* in Great Britain

Perennial or annual herbs. *Shoot* usually weak and straggling, usually glabrous or almost so, more rarely pubescent. *Laminae* lanceolate to ovate. *Inflorescence* rarely solitary. *Flowers* monoclinous. *Sepals n.* *Petals n*, white, more or less deeply 2-cleft, rarely absent. *Stamens* $n+n$ or $n$, or rarely 3; anthers subglobose. *Stigmas n* and antipetalous (in *S. aquatica*) or $n-2$, rarely $n-1$ or $n-3$. *Capsule* subglobose or broadly oval, dehiscing by twice as many teeth as there are stigmas. *Seeds* ∞, more or less tuberculate. *Embryo* almost annular.

About 100 species; cosmopolitan.

### Sections of *Stellaria*

Section I. **Malachium** (see below). *Sepals* free to the base. *Stamens* 10. *Stigmas* 5, alternisepalous. *Capsules* dehiscing by 10 teeth.

Section II. **Eu-Stellaria** (p. 57). *Sepals* free or a little united at the base. *Stamens* 3—10, hypogynous or perigynous. *Stigmas* 3—4, usually 3. *Capsules* dehiscing by 6, rarely 8, teeth.

### Section I. *MALACHIUM*

**Malachium** [Fries *Fl. Halland.* 77 (1817—8) as a genus, nomen;] Bentham and Hooker *Gen. Pl.* i, 149 (1862); [*Cerastium* L. *loc. cit.*, in sensu stricto, quod descr. non aliorum;] *Myosoton* Moench *Meth. Pl.* 235 (1794) as a genus; Pax *op. cit.* 79, as a subgenus.

This section is a connecting link between the very closely allied genera *Cerastium* and *Stellaria*. Cf. also *Dichodon* (p. 55).

For characters, see above. Only British species:—*S. aquatica*.

### 1. STELLARIA AQUATICA. Water Chickweed. Plate 53

*Alsine major glabra* Johnson *Kent* 3 (1629); *Al. major repens perennis* Ray *Syn.* ed. 3, 347 (1724).

**Stellaria aquatica** Scopoli *Fl. Carn.* ed. 2, i, 319 (1772); Syme *Eng. Bot.* ii, 91 (1864); *Cerastium aquaticum* L. *Sp. Pl.* 439 (1753)!; Smith *Eng. Bot.* no. 538 (1799)!; *Fl. Brit.* 501 (1800); *Myosoton aquaticum* Moench *Meth. Pl.* 225 (1794); *Malachium aquaticum* Fries *Fl. Halland.* 77 (1818) descr. gen. nulla; *Fl. Suec.* ed. 2, 122 (1828); Rouy et Foucaud *Fl. France* iii, 199 (1896).

Icones:—Smith *Eng. Bot.* t. 538, as *Cerastium aquaticum*; Curtis *Fl. Lond.* i, 96, as *Cerastium aquaticum*; *Fl. Dan.* t. 1337, as *C. aquaticum*; Reichenbach *Icon.* t. 237, fig. 4967, as *Malachium aquaticum.*

*Camb. Brit. Fl.* iii. *Plate 53.* (*a*) Flowering shoot. (*b*) Petals. (*c*) Ovary. (*d*) Ripe capsule. Huntingdonshire (E. W. H.).

Exsiccata:—Billot, 1443, as *Malachium aquaticum*; Don, 211, as *Cerastium aquaticum*; Fries, vi, 27, as *Malachium aquaticum*; *Herb. Fl. Ingric.* ix, 106, as *Malachium aquaticum.*

Perennial; resembling *S. nemorum* in habit. *Shoot* glandular-pubescent, rarely glabrescent. *Branches* terete, numerous, weak, fragile, straggling, often about 6 dm. long (rarely up to 2—4 times this length). *Petioles* of the lower leaves shorter than the laminae; upper leaves sessile. *Laminae* elliptical-ovate, subcordate or broad at the base, margin wavy, acute, often about 3—4 cm. long and 1·5—1·7 broad. *Pedicels* spreading in fruit and curved near the end, at maturity several times as long as the calyx. *Bracts* leaf-like. *Flowers* pentamerous, isocarpic, about 1·7 cm. in diameter; July to September. *Sepals* ovate, rather acute, glandular-hairy, margins scarious. *Petals* 1·2—1·5 times as long as the calyx, divided nearly to the base, lobes spreading at maturity. *Stamens* 5 + 5, outer ones antipetalous. *Ovary* subglobose. *Stigmas* 5, antipetalous, shorter than the ovary. *Capsule* a little longer than the calyx, dehiscing by 5 valves, each valve bidentate. *Seeds* papillate.

In damp places, chiefly on the banks of ditches and rivers, and in damp waste places in fenny districts; from Cornwall and Kent northwards to Stirlingshire and Forfarshire; rare in Wales, Scotland, and hilly districts generally; not known in Ireland.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 1500 m. in the Tyrol), Russia, southern Europe; Asia; North America (not indigenous).

## Section II. *EU-STELLARIA*

**Eu-Stellaria** Fenzl in Endlicher *Gen. Pl.* 969 (1840) incl. *Larbreae.*

For characters, see page 56.

### Series of *Eu-Stellaria*

Series i. **Mediae** (see below). *Stem* somewhat hairy. *Lower leaves* petiolate. *Stem* subterete. *Sepals* free.

Series ii. **Holosteae** (p. 60). *Stem* glabrous. *Leaves* sessile. *Stem* 4-angled. *Sepals* free or united at the base.

### Series i. *MEDIAE*

**Mediae** nobis; *Petiolares* Fenzl in Endlicher *Gen. Pl.* 969 (1840).

For characters, see above.

### British species of *Mediae*

2. **S. nemorum** (p. 58). Perennial. *Stem* hairy all round, or glabrescent. *Lower leaves* subcordate or markedly truncate at the base. *Flowers* open. *Petals* about twice as long as the sepals. *Stamens* 10.

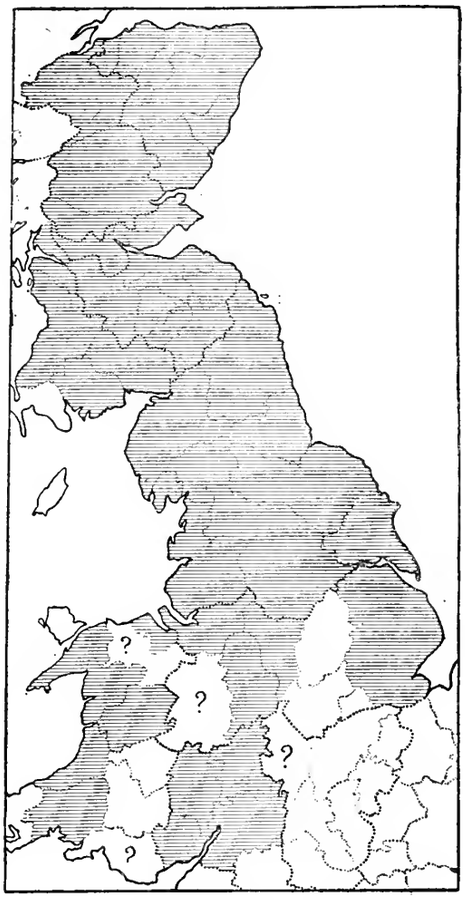
3. **S. neglecta** (p. 58). Ephemeral. *Stem* with a vertical line of hairs, alternating in each node. *Lower leaves* somewhat truncate at the base. *Pedicels* several times as long as the calyx. *Flowers* open. *Petals* about as long as or a little shorter than the sepals. *Stamens* 10. *Anthers* red. *Styles* a little longer than the ovary.

4. **S. media** (p. 59). Like *S. neglecta*, but appearing all the year round, *lower leaves* scarcely truncate, *pedicels* shorter, *flowers* usually open, *stamens* 5—3, and *styles* about as long as the ovary.

5. **S. apetala** (p. 60). Ephemeral. Like *S. media*, but *lower leaves* rather attenuate at the base, *pedicels* very short, *flowers* cleistogamous, *petals* absent, *stamens* 2—3, *anthers* violet, and *styles* very short.

## 2. STELLARIA NEMORUM. Wood Stitchwort. Plate 54

*Alsine montana folio smilacis instar flore laciniato* Dillenius in Ray *Syn.* ed. 3, 347 (1724).




Map 24. Distribution of *S. nemorum* in Great Britain

**Stellaria nemorum** L. *Sp. Pl.* 421 (1753)!; Smith *Eng. Bot.* no. 92 (1792); *Fl. Brit.* 473 (1800)!; Syme *Eng. Bot.* ii, 93 (1864); Rouy et Foucaud *Fl. France* iii, 227 (1896).

Icones:—Smith *Eng. Bot.* t. 92; *Fl. Dan.* t. 271; Reichenbach *Icon.* v, t. 222, fig. 4906.

*Camb. Brit. Fl.* iii. *Plate 54.* (*a*) Flowering shoot. (*b*) Barren shoot. (*c*) Petals. (*d*) Ovaries (one enlarged). Royal Botanic Garden, Edinburgh (I. B. B.).

Exsiccata:—Billot, 225; Fellman, 51; Fries, vi, 28; v. Heurck, i, 6; Reichenbach, 2093; Thieleus et Devos, iii, 204; [*Herb. Fl. Ingric.*, i, 107—a very hairy plant].

Perennial. *Rhizomes* slender. *Shoot* more or less glandular-pubescent, rarely glabrescent. *Branches* decumbent below, terete, numerous, up to 5 dm. long; flowering branches erect, up to 3 dm. high. *Petioles* of the lower leaves about as long as the laminae, becoming shorter above, and the inflorescence-leaves or bracts sessile. *Laminae* ovate, lower ones subcordate, margin ciliate, acute to subacuminate, up to about 3—4 cm. long and 2·0—2·5 broad. *Inflorescence* a dichasial cyme. *Bracts* leaf-like. *Pedicels* several times longer than the calyx. *Flowers* up to about 1·5 cm. in diameter; May to early July. *Sepals* lanceolate, somewhat pubescent, obscurely nerved, narrowly membranous at the margins. *Petals* about 2·0—2·5 times as long as the sepals, deeply bifid, the lobes broadly linear and spreading a little at maturity. *Stamens* 5+5, outer ones antipetalous. *Ovary* cylindrical. *Stigmas* 3. *Capsule* cylindrical, as long as the calyx. *Seeds* papillate.

Damp woods, and in shady places by the sides of streams; from Gloucestershire and Lincolnshire, northwards to Elginshire; not known in Ireland; ascending to 425 m. in Perthshire.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 2150 m.), Russia, southern Europe; Caucasus.

## 3. STELLARIA NEGLECTA. Plate 55

**Stellaria neglecta** Weihe in Bluff et Fingerhuth *Consp. Fl. Germ.* 560 (1825); Boreau *Fl. Centr. France*, éd. 3, ii, 104 (1857); *S. media* var. *procera* Klett und Richter *Fl. Leipz.* 382 (1830); *S. media* var. *major* Koch *Syn.* ed. 2, 130 (1843); Syme *Eug. Bot.* ii, 94 (1864); *S. media* var. *decandra* Fenzl in Ledebour *Fl. Ross.* i, 377 (1842); *S. umbrosa* Opiz und Ruprecht in *Seznam Rost. Vvět Ceské* 93 (1852) nomen; *S. elizabethae* F. Schultz in *Arch. de Fl.* 302 (1861); *S. media* race *neglecta* Rouy *Fl. France* iii, 229 (1896).

Icones:—Reichenbach *Icon.* v, t. 222, fig. 4905, as *S. neglecta*; *Fl. Dan.* t. 438, as *Alsine media.*

*Camb. Brit. Fl.* iii. *Plate 55.* (*a*) Lower part of a shoot. (*b*) Upper part. (*c*) Flower (enlarged). (*d*) Ovaries (enlarged). (*e*) Seeds (one enlarged). Huntingdonshire (E. W. H.).

Exsiccata:—Billot, 1838, as *S. boracana*; 3537, as *S. neglecta*; v. Heurck, iii, 116, as *S. neglecta*; Wirtgen, x, 562, as *S. neglecta*; xiv, 788, as *S. media* var. *sylvatica.*

Closely allied to *S. media*, but differing from it in the following characters. *Shoot* larger in all its parts, dying in July or August and not reappearing until the following spring. *Stem* more erect, 3—6 dm. long. *Laminae* oval to elliptical, truncate at the base, acute to acuminate, up to about 5 cm. long and 2 broad. *Pedicels* relatively much longer, glabrous or hairy or even glandular, up to 3—4 cm. long. *Flowers* larger, about 1 cm. in diameter; mid-April to June. *Sepals* narrower

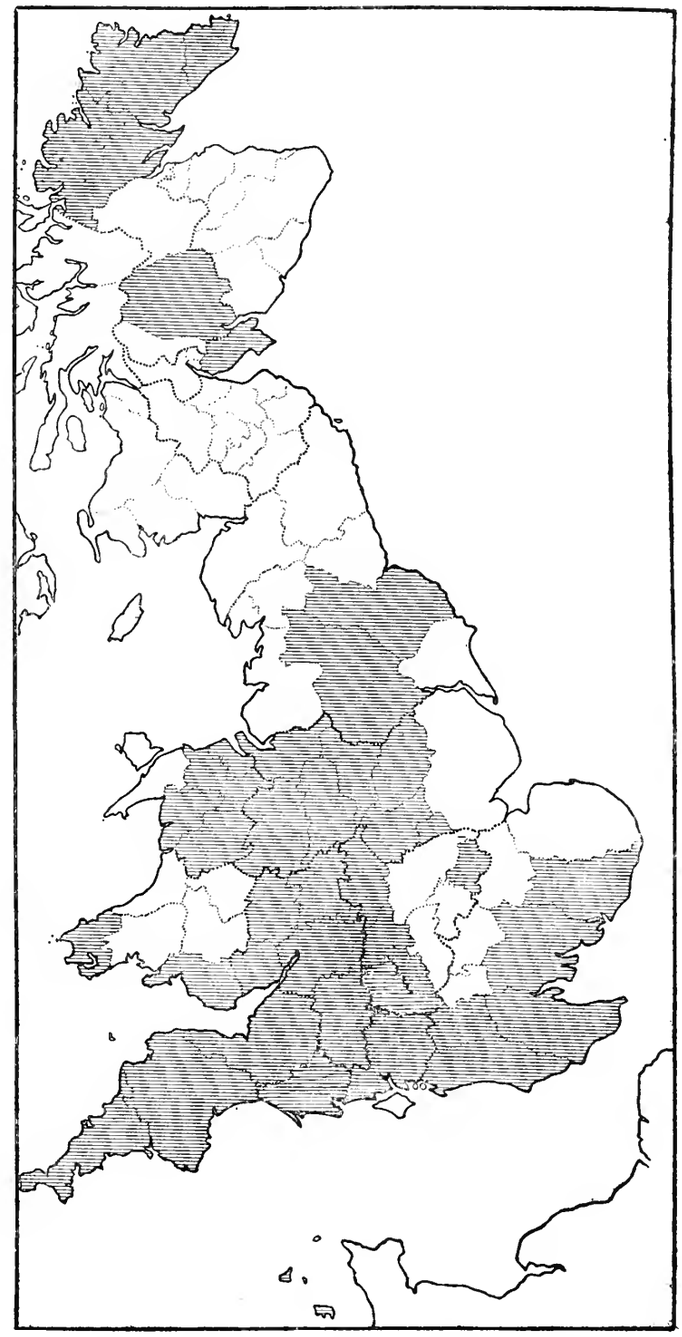
glabrous or hairy. *Petals* as long as the sepals, lobes nearly parallel. *Stamens* 10, outer ones antipetalous. *Anthers* red. *Stigmas* a little longer than the ovary. *Capsule* a little longer than the calyx. *Seeds* larger, acutely or bluntly tuberculate or punctate.

There are apparently two varieties of this in southern England; but their characters do not seem to have been yet properly elucidated, perhaps owing to the difficulty that intermediates occur. Cf. *Bot. Exch. Club Brit. Is., Rep. for 1887*, p. 169; *Journ. Bot.* xl, 214—215 (1902); xlii, 151—153 (1904).

*S. latifolia* DC. *Fl. France* v (*ou* vi) 614 (1815), which has been referred to this species, would seem by the description to be rather a glabrescent form of *S. aquatica*.

Local, in hedgerows; from the Channel Isles, Cornwall, and Kent, northwards to Caithness-shire; common in western England, local in eastern England (e.g., Huntingdonshire), rare or overlooked in Scotland, not recorded for Ireland.

Scandinavia, Denmark, Germany, Belgium, France, central Europe, Russia, southern Europe; northern Africa; Asia Minor; North America (rare and not indigenous).



Map 25. *S. neglecta* has been recorded for the counties which are shaded

## 4. STELLARIA MEDIA. Common Chickweed. Plate 56

*Alsine media* Gerard *Herball* 489 (1597); *A. vulgaris seu morsus gallinae* Ray *Syn.* ed. 3, 347 (1724).

**Stellaria media** Villars *Hist. Pl. Dauph.* iii, 615 (1789); Smith *Eng. Bot.* no. 473 (1800); *Fl. Brit.* 473 (1800)!; Boreau *Fl. Centr. France* éd. 3, ii, 104 (1857); *Alsine media* L. *Sp. Pl.* 272 (1753)!; Scopoli *Fl. Carn.* ed. 2, i, 224 (1772); *S. media* var. *genuina* Syme *Eng. Bot.* ii, 94 (1864); Rouy et Foucaud *Fl. France* iii, 228 (1896).

Icones:—Smith *Eng. Bot.* t. 537; Curtis *Fl. Lond.* i, 54, as *Alsine media*; Reichenbach *Icon.* v, t. 222, fig. 4904; *Fl. Dan.* t. 525.

*Camb. Brit. Fl.* iii. *Plate 56.* (*a*) Flowering branches. (*b*) Petals (one enlarged). (*c*) Ovaries (one enlarged). (*d*) Seeds (two enlarged). Huntingdonshire (E. W. H.).

Exsiccata:—Billot, 2425; Fellman, 52; Schultz 443, as *S. elisabethae*; *Herb. Fl. Ingric.*, i, 108.

Annual. *Stem* much branched, quadrangular, decumbent, straggling, brittle, with vertical lines of hairs alternating at each internode. *Petioles* of the lower leaves often longer than the laminae. *Laminae* ovate, subattenuate at the base, entire, acute. *Pedicels* with a vertical line of hairs, several times as long as the calyx when mature, up to about 1·5 cm. long, reflexed in fruit and curved near the base. *Flowers* about 5—8 mm. in diameter; appearing all the year round unless the temperature remains below about 2° C. *Sepals* hairy, ovate, with a very narrow white margin. *Petals* split almost to the base, lobes spreading at maturity, distinctly shorter than the sepals, sometimes absent—especially in the winter-form of the plant—when the flower is cleistogamous. *Stamens* 0—10, usually 3; when 5, alternipetalous, alternating with the disc-glands. *Anthers* brownish-red or violet-red. *Disc* yellow, glandular. *Stigmas* usually 3, about as long as the ovary, antisepalous. *Capsule* cylindrical, dehiscing by 5 bifid valves. *Seeds* reddish, compressed, punctate.

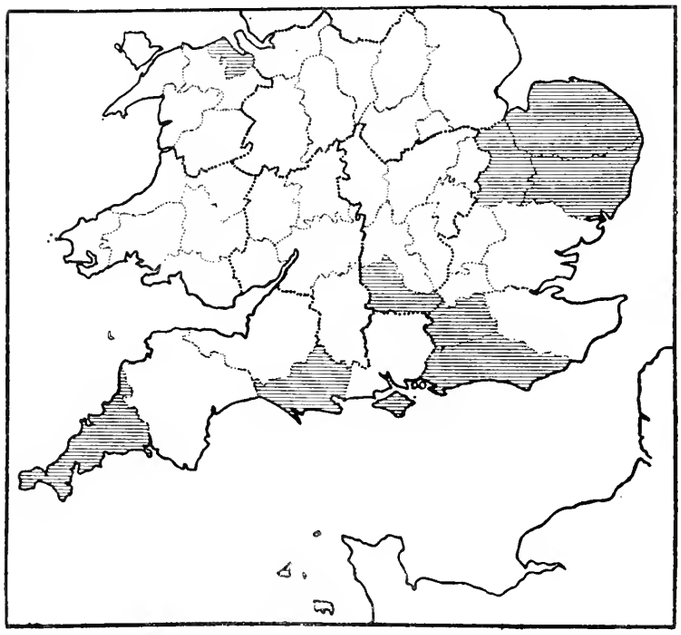
Mr I. H. Burkill (*Journ. Linn. Soc.* xxxi, 219 *et seq.*) examined 5684 plants of this species, mostly growing near Cambridge, and counted the number of their stamens as follows:—0 stamens, 3 plants; 1, 6; 2, 113; 3, 2370; 4, 1293; 5, 1167; 6, 171; 7, 69; 8, 30; 9, 12; and 10, 7.

Waste places and cultivated land; throughout the British Isles; ascending to 530 m. in Perthshire.

Cosmopolitan in its occurrence; but probably not indigenous in America and the southern hemisphere.

## 5. STELLARIA APETALA. Plate 57

**Stellaria apetala** Ucria *Pl. ad Linn. Op. Add.* no. 11, in Roemer *Arch. für die Bot.* i, i, 68 (1796); *Alsine pallida* Dumortier *Fl. Belg.* 109 (1827); Piré in *Bull. Soc. Bot. Belg.* ii, 43 (1863); Babington in *Journ. Bot.* ii, 202 (1864); *Stellaria apetala* Boreau in *Bull. Soc. Indust. Angers* xviii (1847) ex Gürke *loc. cit.*; *S. boraeana* Jordan *Pugillus* 33 (1852); Boreau *Fl. Centr. France* éd. 3, ii, 104 (1857); *S. media* var. *boraeana* Syme *Eng. Bot.* ii, 94 (1864); *S. media* race *apetala* Rouy et Foucaud *Fl. France* iii, 230 (1896); *S. pallida* Gürke *Pl. Eur.* ii, 204 (1899); *S. media* subsp. *pallida* Ascherson und Graebner *Fl. Nordost. Flachl.* 310 (1898).



Map 26. *S. apetala* occurs in the counties which are shaded

Exsiccata:—van Heurck et Martinis, viii, 353; Schultz (*H.N.*), 755; Todaro, 591, as *S. apetala.*

Closely allied to *S. media*, but differing in the following characters. An ephemeral plant, disappearing in early July and not reappearing until the following February. *Internodes* short. *Petioles* of the lower leaves about as long as the laminae. *Laminae* broadly oval, more or less attenuate at the base, acute, small, about 5 mm. long and 4 broad. *Inflorescence* few-flowered or solitary. *Pedicels* about as long as the capsules. *Flowers* cleistogamous; March to May. *Sepals* 3—4 mm. long, with a narrow scarious margin, glandular-hairy. *Petals* absent. *Stamens* 2—3. *Anthers* violet. *Stigmas* very short. *Capsule* elliptical, a little longer than the calyx. *Seeds* about half as large as in *S. media*, faintly punctulate.

(*a*) **S. apetala** var. **major** comb. nov.; *S. media* race *apetala* var. *major* Rouy et Foucaud *Fl. France* iii, 230 (1896).

*Shoot* lax, straggling, pale green. *Branches* and *internodes* long.

This is the usual form met with on sand-dunes. It is very common, for example, in Jersey.

(*b*) **S. apetala** var. **minor** comb. nov.; *S. media* race *apetala* var. *minor* Rouy et Foucaud *Fl. France loc. cit.*

Icones:—*Camb. Brit. Fl.* iii. *Plate 57.* (*a*) Whole plant. (*b*) Flower (enlarged). (*c*) Ripening fruit (enlarged). Suffolk (C. E. M.).

*Plants* growing in low, dense, prostrate, and often circular clumps containing numerous individuals. *Shoot* compact, dark green. *Branches* and internodes short.

This is the common form of the species in inland localities, as, for example, on the sandy soils of the breck country in Suffolk, Norfolk, and Cambridgeshire, where it is a very characteristic plant.

Locally abundant on dry sandy soils, as on the East Anglian heaths and in the neighbouring fallow fields, and on sand dunes; Channel Isles, Isle of Wight, Dorset, Cornwall, Sussex, Surrey, Suffolk, Norfolk, Cambridgeshire, Berkshire, Flintshire, and doubtless elsewhere.

Southern Sweden, Denmark, Germany, Belgium, France, central Europe, Russia, southern Europe; Asia Minor.

### Series ii. *HOLOSTEAE*

**Holosteae** Fenzl in Endlicher *Gen. Pl.* 969 (1840) incl. *Larbreae.*

British species of *Holosteae*

6. **S. holostea** (see below). *Laminae* ciliate. *Bracts* large. *Inflorescence* with about 7—11 flowers. *Petals* longer than the sepals, lobes broad.

7. **S. dilleniana** (see below). *Laminae* glabrous, often glaucous. *Inflorescence* with only 1—3 or rarely 4—7 flowers. *Petals* as long as or longer than the sepals, lobes broad.

8. **S. graminea** (p. 63). *Laminae* ciliolate, not glaucous. *Inflorescence* many-flowered. *Petals* as long as or rather longer than the sepals, lobes very narrow.

9. **S. uliginosa** (p. 63). *Laminae* ciliolate. *Inflorescence* few-flowered. *Petals* much shorter than the sepals, sometimes absent.

## 6. STELLARIA HOLOSTEA. Greater Stitchwort. Plate 58

*Gramen leucanthemum* Gerard *Herball* 43 (1597); *Caryophyllus holosteus arvensis glaber flore majore* Ray *Syn.* ed. 3, 346 (1724).

**Stellaria holostea** L. *Sp. Pl.* 422 (1753)!; Smith *Eng. Bot.* no. 511 (1798)!; *Fl. Brit.* 474 (1800)!; Syme *Eng. Bot.* ii, 96 (1864); Rouy et Foucaud *Fl. France* iii, 231 (1896).

Icones:—Smith *Eng. Bot.* t. 511; Curtis *Fl. Lond.* i, t. 84; *Fl. Dan.* t. 698 (poor); Reichenbach *Icon.* v, t. 223, fig. 4908.

*Camb. Brit. Fl.* iii. *Plate 58.* (*a*) Flowering shoot. (*b*) Barren shoot. (*c*) Leaves. (*d*) Flower. (*e*) Calyx. (*f*) Petal. (*g*) Ovary. Huntingdonshire (E. W. H.).

Exsiccata:—Billot, 1628; Dickson, vii, 6; Fries, xvi, 45; *Herb. Fl. Ingric.* i, 109.

Perennial. *Shoot* glabrous or slightly puberulous above. *Branches* quadrangular, fragile, procumbent below, 2—3 dm., flowering branches erect. *Leaves* all sessile, subconnate, linear, ciliate, acuminate, subglaucous, those of the flowering shoots about 4 cm. long and 4 mm. broad, those of the barren shoots smaller and closer together. *Inflorescence* a dichasial cyme. *Bracts* large, lower ones leaf-like. *Pedicels* puberulous, several times as long as the calyx, of the primary flower about 4 cm. long. *Flowers* pentamerous, very rarely tetramerous, protandrous, 1·5—2·5 cm. in diameter; April to June. *Sepals* ovate, acute, with narrow scarious margins. *Petals* about 1·5—2·0 times as long as the sepals, bifid to about half-way down, lobes broad and not divaricate; rarely absent. *Stamens* 5 + 5, inserted on the yellow nectiferous disc at the base of the ovary, antisepalous ones dehiscing before the antipetalous ones. *Filaments* white. *Anthers* orange. *Stigmas* 3—4, usually 3, as long as the ovary. *Capsule* subglobose, about as long as the calyx. *Seeds* compressed.

Rather dry woods and shady hedgerows; throughout the British Isles, except the Hebrides, Orkney, and Zetland; ascending to 640 m. in Perthshire.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 2800 m. in Switzerland), Russia, southern Europe; northern Africa; south-western Asia; North America (not indigenous).

## 7. STELLARIA DILLENIANA. Marsh Stitchwort. Plate 59

*Caryophyllus holosteus arvensis medius* Ray *Syn.* ed. 3, 347 (1724).

**Stellaria dilleniana** Moench *Enum. Pl. Hass.* 214, t. 6 (1777) excl. syn. ambo[1] (= syn. Dillenii et syn. Moenchi), non Leers (1775) nec Reichenbach (1832); Druce in *Bot. Exch. Club Brit. Rep. for 1910*, ii, 546 (1911); Moss in *New Phyt.* xi, 399 (1912); *S. graminea* var. *β* L. *Sp. Pl.* 422 (1753)!; *S. media* Sibthorp *Fl. Oxon.* 141 (1794) non Villars; *S. palustris* Retzius *Fl. Scand.* ed. 2, 106 (1795); Rouy et Foucaud *Fl. France* iii, 232 (1896); *S. glauca* Withering *Bot. Arr. Brit. Pl.* ed. 3, 420 (1796); Smith *Fl. Brit.* 475 (1800)!; Syme *Eng. Bot.* ii, 97 (1864).

Icones:—Smith *Eng. Bot.* t. 825, as *S. glauca*; *Fl. Dan.* t. 2115, as *S. glauca*; Reichenbach *Icon.* v, t. 223 fig. 4909 (right hand figure), as *S. glauca*; fig. 4909 (left hand figure), as *S. glauca* var. *parviflora.*

*Camb. Brit. Fl.* iii. *Plate 59.* (*a*) Flowering shoots. (*b*) Sepal (enlarged). (*c*) Petals. (*d*) Ovary. Huntingdonshire (E. W. H.).

Exsiccata:—Billot, 1141, as *S. glauca*; Don, 11, as *S. glauca*; Ehrhart herb., 35, as *S. palustris*; Fries, vii 33, as *S. palustris*; Reichenbach, 495, as *S. glauca*; Thielens et Devos, ii, 108, as *S. glauca*; *Herb. Fl. Ingric.* i, 111, as *S. glauca.*

A specimen of this in the Linnaean herbarium is named *S. graminea.*

Perennial. *Rhizome* slender. *Shoot* glabrous, usually (in this country) glaucous. *Branches* rooting at the base, quadrangular, 6 dm., procumbent below, flowering branches erect. *Leaves* all

[1] These appear to belong to *Stellaria uliginosa.*

sessile, linear, acute to acuminate. *Inflorescence* with 1—3, rarely 4—7 flowers. *Bracts* with narrow scarious margins. *Pedicels* not reflexed in fruit, several times as long as the calyx, up to 5 cm. long. *Flowers* up to 2 cm. in diameter; July and August. *Sepals* lanceolate, distinctly veined, acuminate, with scarious margins. *Petals* 1—2 times as long as the sepals, bifid. *Stigmas* 3, rarely 4 or one of them branched, longer than the ovary. *Capsule* subglobose. *Seeds* punctulate.

There are several forms in England of this highly variable species. In particular, three characters may be found occurring in all their theoretical combinations. These characters are (1) glaucousness (= G)[1] and non-glaucousness (or greenness, = g), (2) large petals (= P) (about 1·5—2·0 times as long as the sepals) and small petals (= p) (about as long as the sepals), and (3) many-flowered (5—7) cymes (= C) and few-flowered (1—3) cymes (= c). Thus we may have the following eight theoretical combinations: GPC, GPc, GpC, Gpc, gPC, gPc, gpC, and gpc. Of the plants with these combinations of characters, three have been named by Magnier (in *Bull. Bot. Soc. France* xxviii, 82 (1881)): the GpC plants = *S. litigiosa* Magnier *loc. cit.*: the gPC plants are *S. moenchi* Magnier *loc. cit.*; and the GPc plants are *S. heterophylla* Magnier *loc. cit.* Plants possessing the other five combinations of the above characters do not appear yet to have been named, though any one combination is on *a priori* grounds as important as any other. However, each of the eight forms belongs, in our


Map 27. Distribution of *S. dilleniana* in the British Isles

opinion, to the species *S. dilleniana* (= *S. palustris* = *S. glauca*): Magnier's plants could, of course, be reduced to varieties of this species; but, in that case, it would logically necessitate the creation of five more varieties.

The particular form named *S. dilleniana* in the first instance by Moench was gpc.

It should be remembered, however, that several varieties of the species are already in existence. For example, in Rouy and Foucaud's *Fl. de France*, several forms have been named; but in that work, only two of the above characters (namely, Gg and Pp) are taken into account. Rouy and Foucaud's names may be related as follows:—GP = *S. palustris* var. *communis*: gP = *S. palustris* var. *communis* subvar. *viridis*: Gp = *S. palustris* var. *parviflora*; gp = *S. palustris* var. *parviflora* subvar. *viridis*. If, however, the theoretical combinations which we have above pointed out be reduced to pairs of characters, there are the following combinations to consider:—GP, gP, Gp, gp, GC, gC, Gc, gc, PC, pC, Pc, and pc. Of these, Rouy and Foucaud have named only four, leaving eight unnamed, each of which has logically as much claim to a name as the other four.

Local, in fens and marshes where the water is stagnant and has a high mineral content; from Cornwall and Kent northwards to Perthshire; rare in Wales, northern England, Scotland, and hilly districts generally; western and central Ireland.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, southern Europe; Asia (including the East Indies and New Holland); N. America (not indigenous).

[1] Cf. note under *Spergularia salina*, p. 21, and Moss in *New Phytol.* xi, 399 (1912).

## 8. STELLARIA GRAMINEA. Lesser Stitchwort. Plate 60

*Gramen leucanthemum alterum* Gerard *Herball* 43 (1597); *Caryophyllus holosteus arvensis glaber flore minore* Ray *Syn.* ed. 3, 346 (1724).

**Stellaria graminea** L. *Sp. Pl.* 422 (1753) excl. var. β et var. γ!; Smith *Fl. Brit.* 475 (1800)!; Syme *Eng. Bot.* ii, 98 (1864); Rouy et Foucaud *Fl. France* iii, 234 (1896).

Icones:—Smith *Eng. Bot.* t. 803; *Fl. Dan.* t. 414; Reichenbach *Icon.* v, t. 224, fig. 4910 (the large-flowered form), as *S. dilleniana*; fig. 4911 (the small-flowered form).

*Camb. Brit. Fl.* iii. *Plate 60.* (*a*) Flowering branches (large-flowered form). Huntingdonshire (E. W. H.). (*b*) Flowering branches (small-flowered form). (*c*) Flower (enlarged). (*d*) Ovary. Huntingdonshire (C. E. M.).

Exsiccata:—Billot, 1442; Fellman, 53, as *S. graminea* var. *linearis*; 54, as *S. graminea* var. *lanceolata*; v. Heurck, iii, 112, as *S. graminea* forma *grandiflora*; *Herb. Fl. Ingric.*, i, 112, as *S. graminea* var. *lanceolata*; i, 112 *b*, as *S. graminea* forma *robustiora folia latiores*; i, 112 c, as *S. graminea* var. *eciliata.*

Perennial. *Shoot* glabrous, not glaucous. *Branches* quadrangular, fragile, diffuse, rooting below, 3—9 dm. *Leaves* all sessile, broadly linear, ciliolate, acute, shorter than in *S. dilleniana. Inflorescence* few-flowered (1—3 flowers, rarely 5—7). *Bracts* small, with broad scarious margins. *Pedicels* of the lower flowers up to about 3 cm. long, several times as long as the calyx, reflexed in fruit. *Flowers* 7·5—16 mm. in diameter, protandrous, sometimes gynodioecious; June to October. *Sepals* lanceolate, strongly 3-veined. *Petals* 1—2 times as long as the sepals, bifid to the base, lobes more divaricate narrower than in *S. dilleniana*; rarely absent. *Stamens* 5+5. *Anthers* red. *Stigmas* 3, longer than the ovary. *Capsules* subglobose, a little longer than the calyx. *Seeds* subglobose, dark brown.

In the Linnaean herbarium there are two specimens named *S. graminea*: one is given to the plant now universally known by this name, and the other to *S. dilleniana* (= *S. palustris* = *S. glauca*).

Dr A. S. Horne (in *New Phyt.* xiii, 73 (1914)) has described some interesting British variations of this species, which in many ways are paralleled by those of *S. dilleniana* (see p. 62).

Willdenow (*Sp. Pl.* ii, 716 (1800)) described a *Stellaria* named *S. scapigera*, from a plant in the botanic gardens at Berlin. It is figured in *Eng. Bot.* ed. 1, t. 1269, and issued (no. 10) by Don in his set of dried plants. Syme (*op. cit.* 99) regards it as "apparently a monstrosity of *S. graminea*"; and, "like many other abnormal forms, it appears to be constant under cultivation."

Common, throughout the British Islands, in pastures, on commons, in hedgebanks, and sandy or gravelly pastures; perhaps commoner on light than on heavy soils, and on siliceous than calcareous soils; ascending to 490 m. in Perthshire.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 2000 m. in the Tyrol), Russia, southern Europe; Asia; North America (not indigenous).

## 9. STELLARIA ULIGINOSA. Bog Stitchwort. Plate 61

*Alsine fontana* Gerard *Herball* 490 (1597); *Alsine longifolia uliginosis proveniens locis* J. Bauhin *Hist.* iii, pt. ii, 365 (1661); Ray *Cat. Cantab.* 8 (1660); *Syn.* ed. 3, 347 (1724).

**Stellaria uliginosa** Murray *Prodr. Stirp. Götting.* 55 (1770); Smith *Fl. Brit.* 476 (1800)!; Syme *Eng. Bot.* ii, 99 (1864); Rouy et Foucaud *Fl. France* iii, 235 (1896); *S. graminea* var. γ L. *Sp. Pl.* 422 (1753); *S. dilleniana* Leers *Fl. Herborn.* 107 (1775); ed. 2, 108 (1789); non Moench.

Icones:—Smith *Eng. Bot.* t. 1074; Curtis *Fl. Lond.* 1, 88; Reichenbach *Icon.* v, t. 226, fig. 3669, as *Larbrea uliginosa.*

*Camb. Brit. Fl.* iii. *Plate 61.* (*a*) Flowering shoot. (*b*) Flower (enlarged). (*c*) Persistent calyx and fruit (enlarged). Jersey (E. W. H.).

Exsiccata:—Billot, 2636; Bourgeau (*Pl. d'Ésp.*), 1548; Ehrhart herb., 6; Fries, iii, 32; v. Heurck, i, 47; Huter, 983; Reichenbach, 67, as *Larbrea aquatica*; Tausch, as *S. linoides*; *Herb. Fl. Ingric.* i, 115.

Perennial. *Shoot* glabrous or nearly so, subglaucous. *Branches* diffuse below, erect or diffuse above, rooting a little at the base, quadrangular, up to 2 dm. long. *Leaves* sessile or subsessile, elliptical, ciliolate at the base, attenuate at each end. *Inflorescence* few-flowered. *Bracts* broad, with broad scarious margins. *Pedicels* of the lowest flowers up to about 1·5 cm. long, at length reflexed. *Flowers* up to about 8 mm. in diameter; June to August. *Sepals* lanceolate, acuminate, about 3 or 4 mm. long, united a little at the base, with scarious margins. *Petals* shorter than the sepals, bifid, lobes very narrow; rarely absent. *Stamens* inserted (along with the petals) on the perigynous disc. *Stigmas* usually 3. *Capsule* ovate-cylindrical, shorter than the calyx. *Seeds* very small, reddish-brown, punctulate.

There is a specimen of this plant in the Linnaean herbarium; but it is unnamed.

A dwarfed land-form, and an apetalous form, also occur. The latter is *Larbrea uliginosa* var. *apetala* Reichenbach *Icon.* v, 36 (1841).

By the sides of rivulets and in springs; in every county in the British Isles; preferring well-aërated water with a low mineral-content; ascending to over 900 m. in Perthshire.

Faeröes, Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 2200 m. in the Tyrol), Russia, southern Europe; northern Africa; Asia (eastwards to Japan and Formosa); North America.

## Genus 10. Holosteum

**Holosteum** [Dillenius *Cat. Giss.* 130, t. 6 (1719);] L. *Sp. Pl.* 88 (1753) et *Gen. Pl.* ed. 5, 39 (1754) diagn. emend.; DC. *Prodr.* i, 393 (1824); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 80 (1889).

Closely allied to *Stellaria*, differing chiefly in the *petals* being tridentate with the middle tooth longer than the lateral ones, and the *inflorescence* a cymose umbel.

About 6 species; Europe and temperate Asia.

### 1. HOLOSTEUM UMBELLATUM. Plate 62

*Caryophyllus holosteus arvensis* Gerard *Herball* 477 (1597); *Holosteum quae alsine verna glabra floribus umbellatis* Dillenius *App. Cat. Giss.* 130, t. 6 (1719).

**Holosteum umbellatum** L. *Sp. Pl.* 88 (1753)!; Rose *Elements Bot.* 445, t. 2 app. (1775); Smith *Eng. Bot.* no. 27 (1791); *Fl. Brit.* 161 (1800); Syme *Eng. Bot.* ii, 75 (1864); Rouy et Foucaud *Fl. France* iii, 236 (1896); *Cerastium umbellatum* Hudson *Fl. Angl.* ed. 2, 201 (1778).

Icones:—Smith *Eng. Bot.* t. 27; *Fl. Dan.* t. 1204; Reichenbach *Icon.* v, t. 221, fig. 4901:

*Camb. Brit. Fl.* iii. *Plate 62.* (*a*, *b*, *c*, *d*) Fertile plants. (*e*) Part of peduncle (enlarged). (*f*) Sepal (enlarged). (*g*) Fruits. (*h*) Capsule (enlarged). (*i*) Seed (enlarged). Surrey (R. C.). (*j*) Fruiting branches. (*k*) Sepals (one enlarged). (*l*) Petals (two enlarged). (*m*) Ovaries (one enlarged). Cambridge Botanic Garden (R. I. L.).

Exsiccata:—Billot, 117; Dickson, ii, 5; Fries, i, 40; Reichenbach, 2092, as *H. heuffeli.*

Ephemeral. *Branches* decumbent or ascending, glabrous below, more or less glutinous above, rather glaucous, up to 10 cm. long but usually much shorter. *Leaves* sessile, elliptical, subconnate, entire, acute, rather thick; rosette leaves soon withering. *Inflorescence* a cymose umbel, with 2—8 flowers. *Pedicels* eventually about 1·0—1·5 cm. long. *Flowers* up to about 1 cm. in diameter; reflexed after flowering, erect in fruit. *Bracts* very small, involucral. Late March and early April. *Sepals* ovate, acute, about 3—4 mm. long, with scarious margins. *Petals* a little longer than the sepals. *Stamens* about 3. *Stigmas* 3. *Capsule* broadly elliptical, a little longer than the calyx. *Seeds* dark red, punctulate.

Map 28. *Holosteum umbellatum* has been found in Surrey, Suffolk, and Norfolk, but is extinct in most of its former stations

After being apparently extinct for many years as a British plant, this species was again found in Surrey, in April, 1905.

Very rare, sandy cornfields and fallows, and on old walls and thatched roofs; Surrey, Suffolk, Norfolk.

Southern Sweden, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 1700 m. in the Tyrol), Russia, southern Europe; northern Africa; Asia; North America (not indigenous).

## Tribe V. *LYCHNIDEAE*

**Lychnideae** Reichenbach *Handb. Natürl. Pflanzen.* 298 (1837) emend.; Al. Braun in *Flora* xxvi, 365 (1843); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 70 (1889).

For characters, see page 14.

### Genera of *Lychnideae*

Genus 11. **Agrostemma** (p. 65). *Sepals* with elongate teeth. *Petals* without coronal scales. *Stigmas* 5, alternisepalous. *Gynophore* absent. *Capsule* without septa at maturity, dehiscing septicidally by 5 carpellary alternisepalous teeth.

Genus 12. **Lychnis** (p. 66). *Petals* with coronal scales. *Stigmas* 5, antisepalous. *Gynophore* short. *Capsule* almost without septa, dehiscing septicidally by 5 carpellary antisepalous teeth.

Genus 13. **Viscaria** (p. 67). *Petals* with coronal outgrowths. *Stigmas* usually 5, antisepalous. *Gynophore* half as long as the capsule. *Capsule* with persistent septa, dehiscing loculicidally by 5 antisepalous teeth.

## Genus 11. Agrostemma

By R. H. COMPTON, M.A.

**Agrostemma** L. [*Gen. Pl.* 135 (1737);] *Sp. Pl.* 435 (1753) et *Gen. Pl.* ed. 5, 198 (1754) partim; Fries in *Bot. Notiser* 169 (1842); A. Braun in *Flora* xxvi, 367 (1843); Pax *op. cit.* p. 70 (1889); *Lychnis* Scopoli *Fl. Carn.* ed. 2, i, 302 (1772) partim; Syme *Eng. Bot.* ii, 70 (1864); pro min. parte, non L.; *Githago* [Tragus *De Stirp.* 127 (1552) nomen; Adanson *Fam. Pl.* ii, 255 (1763);] Link *Dissert. Bot. Suerin* 62 (1795).

Annual or biennial herbs covered with greyish hairs. *Calyx* 10-ribbed, with 5 elongated teeth. *Petals* almost entire, without coronal scales. *Gynophore* short. *Stamens* 10. *Carpels* and *stigmas* 5, alternisepalous. *Fruit* a capsule, hard-walled, without persistent septa, dehiscing septicidally at the apex by 5 alternisepalous teeth. *Seeds* reniform, surface rough, dark-coloured, on long funicles.

2 species; Europe and the Mediterranean region, and widely introduced elsewhere. Only British species:—*A. githago*.

### 1. AGROSTEMMA GITHAGO. Corn Cockle. Plate 63

*Githago sive nigellastrum* Turner *Libellus Herb. Nov.* (1538); *Pseudomelanthium* Gerard *Herb.* 926 (1597); *Lychnis segetum major* C. Bauhin *Pinax* 204 (1761); Ray *Syn.* ed. 3, 338 (1724).

**Agrostemma githago** L. *Sp. Pl.* 435 (1753)!; Smith *Fl. Brit.* 493 (1800)!; Rouy et Foucaud *Fl France* iii, 88 (1896); *Lychnis githago* Scopoli *Fl. Carn.* ed. 2, i, 310 (1772); Roehling *Deutschl. Fl.* ed. 3, iii 330 (1831); Syme *Eng. Bot.* ii, 74 (1864); *Githago segetum* Link *Dissert. Bot.* 62 (1795) nomen.

Icones:—Smith *Eng. Bot.* t. 741; Curtis *Fl. Lond.* i, t. 92; *Fl. Dan.* t. 576; *Svensk Bot.* t. 488; Reichenbach *Icon.* vi, t. 308, fig. 5132, as *Githago segetum.*

*Camb. Brit. Fl.* iii. *Plate 63.* (*a*) Lower part of shoot. (*b*) Upper part of shoot. (*c*) Flower. (*d*) Ripening capsule within persistent calyx. (*e*) Ripening capsule. Cambridgeshire (S. S.).

Exsiccata:—Billot, 224; Croall (*Fl. Braemar*), 507; Lindström (*Pl. Finl.*), 200, as *G. segetum*; Paulin (*Fl. Carn.*), 260; Petrak (*Fl. Boh. et Morav.*), 941; Sintenis (*Fl. Or. 1892*), 4076, as *G. segetum*; Todaro, 801; Welwitsch (*Fl. Lusit.*), 1018; Woloszczak (*Fl. Polon.*), 513.

Annual or biennial, without rhizome or barren shoots. *Shoot* covered with long appressed grey hairs. *Stem* up to nearly 1 m. high, stiffly erect, usually branched; method of branching a dichasium of which only one axillary shoot develops. *Leaves* lower ones linear or linear-lanceolate, slightly connate, acute or obtuse, 4—10 cm. long. *Inflorescence* solitary. *Pedicels* long. *Flowers* large, 4—5 cm. in diameter, showy; June to August. *Calyx* with linear or lanceolate acute teeth equalling or exceeding the length of the corolla. *Petals* reddish purple, occasionally white, with longitudinal lines of dark dots; limb rounded, deltoid; claw linear. *Anthers* dark blue. *Capsule* ovoid, sessile, its teeth slightly reflexed. *Seeds* poisonous, 3 mm. in diameter.

The white-flowered form was named *G. segetum* var. *albiflorum* by Schur (*Enum. Pl. Transsilv.* 108 (1866)). De Vries (*Berichte Bot. Ges.* xviii, 87 (1900)) found that the white-flowered character behaves as a simple Mendelian recessive to purple, the $F_2$ generation containing about 25 % of white-flowered plants.

The older records indicate that *A. githago* was once more abundant in this country than at present.

(*a*) **A. githago** var. **aestivalis** Compton in Moss *Camb. Brit. Fl.* iii, p. 65.

*Laminae* narrow, acute. *Flowers* appearing in June.

Adapted for growth with spring-sown crops. Probably the more abundant variety.

(*β*) var. **aestivalis** forma **nana** Compton in Moss *Camb. Brit. Fl.* iii, p. 65; *A. githago* var. *nana* Hartman *Skand. Fl.* ed. 5, 128 (1849); *G. thessala* Formánek in *Verh. Nat. Ver. Brünn* xxv, Abh., 197 (1897).

This is a dwarf state which, although connected by all intermediates with the typical well-grown plant, is very striking. It appears to be the result of growth under adverse circumstances, as on dry stony ground. The *stem* is from 10 to 20 cm. high, and bears 4—7 distant pairs of very slender leaves about 15 mm. long and 1 broad. The *flower* is single and terminal, the *calyx* about as long as the corolla, as a rule with its tube about 8 mm. long and 3 broad and the limb 6—12 mm. long. The form closely approaches *A. gracile* Boissier (*Diagn. Pl. Orient. Nov.* ser. 2, i, 80 (1853)), the only other species of the genus, which is apparently an east-Mediterranean plant and which has much shorter calyx-teeth. The var. *microcalyx* Döll (*Fl. Baden* 1232 (1862)) is apparently a synonym of *A. gracile*, as both Döll and Boissier quote Kotschy (Exsicc. no. 65). Cf. Druce *Fl. Berksh.* 89 (1897).

The forma *nana* occurs here and there over the whole range of the species.

(*b*) **A. githago** var. **hiemalis** Compton in Moss *Camb. Brit. Fl.* iii, p. 66.

*Leaves* larger and broader, obtuse, young ones forming a rosette. *Flowers* appearing in July.

The rosette of leaves is formed no matter whether the seeds are sown in autumn or in spring. The distinguishing of these two seasonal forms is due to Nathansohn (in *Jahrbüch. wissensch. Bot.* liii, 125—153 (1913)). Intermediates were not found wild, but were produced by artificial crossing.

Cambridgeshire, and doubtless elsewhere.

A weed of arable land, especially on light soils, usually associated with cereals and leguminous crops; ascending in several counties to about 200 m. Recorded for all the counties of Great Britain except Brecknockshire, Pembrokeshire, Montgomeryshire, Merionethshire, Peeblesshire, Selkirkshire, western Inverness-shire, Argyllshire, Hebrides, western Ross-shire, Sutherlandshire, Orkney, and Zetland—all hilly or northern counties. In Ireland, it is recorded for all counties except Queen's, King's, Longford, Roscommon, Leitrim, Cavan, and Monaghan—counties in which light soils are absent or rare.

Europe (exc. Arctic, and ascending to 1820 m. in Switzerland) and the Mediterranean region; Asia; South Africa (introduced); North America (introduced).

## Genus 12. Lychnis

By R. H. COMPTON, M.A.

**Lychnis** [Tournefort *Inst.* 333, t. 175 (1700);] L. *Sp. Pl.* 436 (1753) et *Gen. Pl.* ed. 5, 198 (1754) pro min. parte; Fries in *Bot. Notiser* 169 (1842) pro parte (hoc est *Eu-Lychnis*); Rohrbach in *Linnaea* xxxvi, 175 (1869); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 b, 73 (1889); *Hedona* Loureiro *Fl. Cochinch.* 286 (1790); *Coronaria* Al. Braun in *Flora* xxvi, 367 (1843); Williams in *Journ. Bot.* xxxi, 170 (1893).

*Flowers* monoclinous. *Calyx* with 5 persistent teeth and with 10 veins of which 5 are commissural. *Petals* 5, contorted in bud, with 2 coronal scales at the base of the limb. *Stamens* 10. *Gynophore* short. *Stigmas* usually 5, without hairs. *Fruit* a capsule, unilocular, with only slight remains of the partial septa, dehiscing septicidally by usually 5 teeth along the margins of the carpels. *Seeds* ∞ in each capsule, without appendages. *Embryo* semicircular.

The only British species, *L. flos-cuculi*, belongs to the section *Coccyganthe* (Reichenbach *Fl. Germ. Excurs.* 825 (1832) emend. Rohrbach in *Linnaea* xxxvi, 178 (1869)) of the subgenus *Coronaria* ([A. Braun in *Flora* xxvi, 367 (1843) as a genus] Pax *op. cit.* p. 73).

10 species, North Temperate and Arctic zones. Only British species:—*L. flos-cuculi.*

### 1. LYCHNIS FLOS-CUCULI. Ragged Robin. Plate 64

*Armoraria pratensis mas* Gerard *Herball* 480 (1597); *L. plumaria sylvestris simplex* Parkinson *Parad.* 253 (1629); Ray *Syn.* ed. 3, 338 (1724).

**Lychnis flos-cuculi** L. *Sp. Pl.* 436 (1753); Smith *Eng. Bot.* no. 573 (1799); *Fl. Brit.* 493 (1800)!; Syme *Eng. Bot.* ii, 71 (1864); Rohrbach in *Linnaea* xxxvi, 181 (1869); Rouy et Foucaud *Fl. France* iii, 90 (1896); *Melandryum flos-cuculi* Roehling *Deutsch. Fl.* ed. 2, 275 (1812); *L. plumaria* Gray *Nat. Arr. Brit. Pl.* ii, 649 (1821); *Agrostemma flos-cuculi* G. Don *Gen. Syst.* i, 417 (1831); *Coronaria flos-cuculi* Al. Braun in *Flora* 369 (1843); Ascherson und Graebner *Fl. Nordost. Flachl.* 300 (1898).

Icones:—Smith *Eng. Bot.* t. 573; Curtis *Fl. Lond.* i, 91; *Fl. Dan.* t. 590; Reichenbach *Icon.* vi, t. 306, fig. 5129.

*Camb. Brit. Fl.* iii. *Plate 64.* (*a*) Lower part of shoot. (*b*) Flowering branches. (*c*) Capsules. Jersey (E. W. H.).

Exsiccata:—Billot, 116; Lindström, 199, as *Coronaria flos-cuculi*; *Fl. Exsicc. Austr.-Hung.* 52; Woloszczak, 410.

Perennial herbaceous geophyte. *Stem* erect, branched only in the inflorescence, furrowed, slightly hispid with a few scattered hairs. *Leaves* glabrous or with only a few hairs, acute or obtuse, dark green; basal ones forming a rosette, lanceolate or oblong-spathulate, narrowed to a petiole; stem-leaves lanceolate or linear-lanceolate. *Inflorescence* a dichasium, the length of the peduncles and pedicels varying greatly. *Bracts* linear; margin white, ciliate. *Flowers* drooping, nectiferous, protandrous, about 2—3 cm. in diameter; May and June. *Calyx* campanulate, swollen round the fruit but clasping it tightly, with prominent purple veins; teeth triangular, acuminate, white-margined. *Petals* deep rose-coloured (occasionally white or pale pink), deeply 4-partite, the 2 inner segments

oblong, the 2 outer ones linear and spreading, bearing long acute appendages which are often toothed and not gibbous. *Gynophore* stout, short. *Ovary* green, much broader than the gynophore. *Stigmas* rather longer than the ovary, whitish. *Capsule* subglobose, opening by 5 recurved teeth. *Seeds* ∞, small, reniform, tuberculate, with convex sides and back, on long funicles.

Plants with white flowers (subvar. *albiflora* Peterman *Fl. Lips.* 332 (1838)) occur, and also plants with flesh-coloured flowers. The latter may be hybrids, but there is no experimental knowledge on the subject: all three colour-forms sometimes grow in company.

Double flowers are occasionally found, and are in cultivation: the doubling is due to petalody of the stamens. The numbers of the floral parts vary to some extent as in many members of the *Dianthaceae*.

(β) subvar. **integripetala** Compton in Moss *Camb. Brit. Fl.* iii, p. 67.

*Petals* not laciniate, only slightly notched at the apex.

Devonshire (W. Wise, in Herb. Mus. Brit.; cf. *Journ. Bot.* xxxv, 284 (1897)).

(γ) forma **congesta** Compton in Moss *Camb. Brit. Fl.* iii, p. 67; *L. flos-cuculi* var. *congesta* Lecoq et Lamotte *Cat. Pl. Centr. France* 98 (1847).

*Flowers* on very short peduncles and pedicels, crowded together in a terminal cymose corymb or head.

A sub-Alpine form, occurring in peaty mountain bogs (A. Croall, in Herb. Mus. Brit.).

(δ) forma **maritima** Compton in Moss *Camb. Brit. Fl.* iii, p. 67.

*Leaves* longer, especially the stem-leaves, almost glabrous. *Stem* thicker. *Inflorescence* small and dense as in forma *congesta*. *Flowers* smaller.

In salt-marshes (Hodgson, in Herb. Mus. Brit.); Walney Island, Lancashire.

(ε) forma **latifolia** Bolle *Verh. Bot. Ver. Prov. Brandenb.* vii, 19 (1865).

*Leaves and inflorescence* unusually large. *Pedicels* long.

A luxuriant shade-grown form (Forbes Young, in Herb. Mus. Brit.), Thames Ditton, Surrey.

(ζ) forma **debilis** Compton in Moss *Camb. Brit. Fl.* iii, p. 67; L. *cyrilli* [Richter ex] Reichenbach *Icon.* vi 55, t. 306, fig. 5129 b (1844); *L. flos-cuculi* subsp. *cyrilli* Rouy et Foucaud *Fl. France* iii, 91 (1896).

Icones:—Reichenbach *loc. cit.*, as L. *cyrilli*.

Weaker and more slender, and with very little anthocyanin in the stem, leaves, and calyx. *Peduncles* and *pedicels* long. *Flowers* rather smaller.

Occurs here and there.

Austria, Corsica, Sicily, Servia, Bulgaria—(Rouy and Foucaud *loc. cit.*).

Common on stream-banks, in damp meadows, marshes, *Juncus*-swamps, alder-willow copses, osier-beds, fens, and rarely in salt-marshes; throughout the British Islands; ascends to 600 m. in Scotland, but for the most part a lowland or submontane species; tolerant as to the chemical nature of soils but prefers a strong or moderate mineral-content as well as a strong illumination, and demands at least a fairly high water-content; absent or very rare in acidic peat.

The Faeröes, Iceland, Scandinavia, Denmark, Germany, Belgium, Holland, France, central Europe (ascending to 2100 m. in Switzerland), Russia, southern Europe; central and northern Asia; North America (not indigenous).

## Genus 13. Viscaria

By R. H. COMPTON, M.A.

**Viscaria** [Ruppius *Fl. Jen.* ed. Haller 126 (1745);] Roehling *Deutschl. Fl.* ed. 2, ii, 37 (1812) emend.; Fenzl in Endlicher *Gen. Pl.* 973 (1841) excl. sect. *Eudianthe*; Fries in *Bot. Notiser* 170 (1842); A. Braun in *Flora* xxvi, 376 (1843); Grenier et Godron *Fl. France* i, 221 (1848); Rohrbach in *Linnaea* xxxvi, 264 (1869); Rouy et Foucaud *Fl. France* iii, 99 (1896); *Lychnis* L. *loc. cit.* partim; *Liponeurum* Schott *Anal. Bot.* 55 (1854).

*Flowers* monoclinous. *Calyx* herbaceous, tubular, with 5 equal teeth. *Petals* more or less notched or emarginate, with 2 coronal scales, claw often winged. *Stamens* usually 10. *Gynophore* half as long as the capsule. *Ovary* with usually 5 carpels, opposite the calyx-teeth, partially septate from the base, with 5 stigmas. *Capsule* dehiscing loculicidally, teeth as many as the stigmas. *Seeds* ∞.

5 species; northern and central Europe and Asia.

British species of *Viscaria*

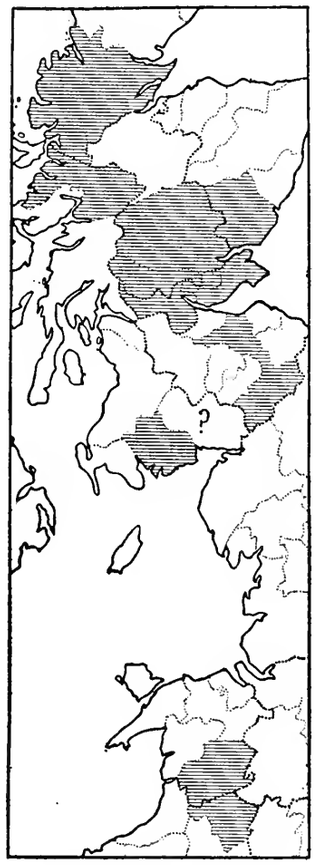
1. **V. vulgaris** (see below). *Stem* more or less viscid. *Petals* emarginate. *Seeds* with acute tubercles.

2. **V. alpina** (p. 69). *Stem* glabrous. *Petals* deeply cleft. *Seeds* with blunt tubercles.

## 1. VISCARIA VULGARIS. Catchfly. Plates 65, 66

*Muscipula angustifolia* Johnson in Gerard *Herball* ed. 2, 601 (1636); *Lychnis sylvestris viscosa rubra angustifolia* Parkinson *Theatr. Bot.* 636 (1640); Ray *Cat.* 202 (1670); *Syn.* ed. 3, 340 (1724).

**Viscaria vulgaris** Roehling *Deutschl. Fl.* ed. 2, ii, 275 (1812); G. Don *Gen. Syst.* i, 414 (1831); Rohrbach in *Linnaea* n.s., ii, 265 (1869); Rouy et Foucaud *Fl. France* iii, 99 (1896); *Lychnis viscaria* L. *Sp. Pl.* 436 (1753)!; Smith *Fl. Brit.* 494 (1800)!; Syme *Eng. Bot.* ii, 72 (1864); *Lychnis viscosa* Scopoli *Fl. Carn.* ed. 2, i, 306 (1772); Gilibert *Fl. Lituan.* iv, 171 (1782); nomen abortivum; *Viscaria purpurea* Wimmer *Fl. Schles.* ed. 2, 67 (1841); Fries in *Bot. Notiser* 170 (1842); *Viscaria viscosa* Ascherson *Fl. Brandenb.* 85 (1864); *Viscaria viscaria* Ascherson und Graebner *Fl. Nordost Flachl.* 299 (1898).



Map 29. Distribution of *V. vulgaris* in Great Britain

Icones:—Smith *Eng. Bot.* t. 788, as *Lychnis viscaria*; *Fl. Dan.* t. 1032, as *L. viscaria*; *Svensk Bot.* t. 672, as *L. viscaria*; Reichenbach *Icon.* vi, t. 307, fig. 5131, as *Lychnis viscaria.*

*Camb. Brit. Fl.* iii. *Plate 65.* (*a*) Barren shoot. (*b*) Flowering shoot. (*c*) Petal. Perthshire (E. S. M.). *Plate 66.* (*a*) Barren shoot. (*b*) Flowering shoot. (*c*) Petal. (*d*) Ovary. Wales (E. F. L.).

Exsiccata:—Billot, 730, as *Viscaria purpurea*; Fries, xv, 38, as *V. purpureo-alpina s. media*; v. Hayek (*Fl. Stir. Exsicc.*), 213, as *V. viscosa*; v. Heurck et Martinis, vii, 304, as *Lychnis viscaria*; Lindberg (*Fl. Finl. Exsicc.*), 197, as *V. viscosa*; Thielens et Devos, iv, 352, as *L. viscaria*; Woloszczak, 806; *Herb. Fl. Ingric.* i, 101, as *Viscaria vulgaris.*

Perennial. *Rhizome* bearing rosettes of leaves and flowering stems. *Stem* erect, terete, unbranched, 20—60 cm. high, with long internodes, purplish above, the upper part of each internode covered with a viscous secretion to which small insects often adhere. *Leaves*—basal ones linear-oblong to linear-lanceolate, narrowing to the petiole, thin, with a strong midrib, deep green, glabrous, up to 15 cm. long and 3—10 mm. broad; stem-leaves linear to lanceolate, sessile, shortly connate, up to 10 cm. long. *Bracts* like the leaves but shorter. *Inflorescence* of paired opposite axillary dichasia, crowded towards the apex; each cyme with a peduncle of a length of 5—20 cm. *Flowers* with short pedicels; May and June. *Calyx* oblong-obconical, umbilicate, swollen in fruit, purplish, with short triangular acute teeth and 10 scarcely prominent veins; sometimes slightly downy. *Petals* lilac-purple (occasionally white), with obovate, slightly emarginate, spreading limbs and broadly winged claws, with 2 long coronal ligules (one-third to half as long as the limbs). *Anthers* grey, exserted. *Gynophore* long, slightly shorter than the capsule. *Capsule* oblong-ovoid, with persistent partial septa. *Seeds* ∞, small, reniform, furrowed on the back, finely granulate, brown.

Two forms occur, as shown in Plates 65 and 66, differing in the compactness of the inflorescence, the number of the flowers, and in the size and shape of the petals and coronal ligules. These require further study.

*V. vulgaris*, its white-flowered form, and a form with double flowers are in cultivation.

Chiefly on trap rocks, stony slopes, cliffs, and hill-pastures; between 150 and 300 m. in districts having a rainfall of 100—200 cm. per annum; Wales—Radnorshire, Montgomeryshire; Scotland—Kirkcudbrightshire, Roxburghshire, Edinburghshire, Fifeshire, Forfarshire, Stirlingshire, Perthshire. Not recorded for England or Ireland.

Southern Scandinavia, Germany, Denmark, Holland, Belgium, France, Russia, central Europe (ascending to 1400 m. in the Tyrol), southern Europe; Asia.

## 2. VISCARIA ALPINA. Alpine Campion. Plate 67

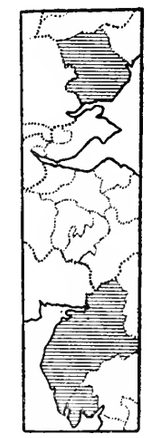
**Viscaria alpina** G. Don *Gen. Syst. Gard.* i, 415 (1831); Rouy et Foucaud *Fl. France* iii, 100 (1896); *Lychnis alpina* L. *Sp. Pl.* 436 (1753)!; Smith in *Trans. Linn. Soc.* x, 342 (1811)!; *Eng. Bot.* no. 2254 (1811); Syme *Eng. Bot.* ii, 73 (1864).

Icones:—Smith *Eng. Bot.* t. 2254, as *Lychnis alpina*; *Fl. Dan.* t. 65, as *Lychnis alpina*; *Bot. Mag.* t. 394, as *Lychnis alpina*; *Svensk Bot.* t. 693, as *Lychnis alpina*; Reichenbach *Icon.* vi, t. 307, fig. 5130, as *Lychnis alpina*.

*Camb. Brit. Fl.* iii. *Plate 67.* (*a*) Plant in flower. Hort., origin Switzerland (E. W. H.). (*b*) Plant in flower. (*c*) Plant in fruit. (*d*) Petals (enlarged). (*e*) Ovary. (*f*) Capsules. Forfarshire (E. S. M.).

Exsiccata:—Billot, 1621, 1621 bis, as *Viscaria alpina*; Fellman, 36, as *Lychnis alpina*; Fiori (*Fl. Ital. Exsicc.*), 812, as *L. alpina*; Fries, ix, 35, as *L. alpina* ("cfr. v. *petraeam*, H.N., iv"); iv, 49, as *L. alpina* var. *subacaulis*; Huter (*Fl. Exsicc. Austr.-Hung.*), 520, as *L. alpina*; Macoun (*Herb. Geol. and Nat. Hist. Surv. Canada*), 266; Reichenbach, 1798, as *L. alpina*.

Perennial. *Rhizome* short, giving off basal rosettes of leaves. *Stem* simple, erect, usually 5—10 cm. high (less in forma *frigida*, and may reach 30 cm. in forma *laxa*), bearing about 3 pairs of leaves. *Stem* glabrous, not viscid. *Leaves* of the basal rosettes linear, about 4 cm. long and 0·4 broad, with a few marginal cilia; of the stem, linear or linear-lanceolate, up to about 2 cm. long and 0·3 broad. *Inflorescence* a dense terminal head of crowded axillary cymes, or somewhat elongated in f. *laxa*. *Bracts* ovate-lanceolate, ciliate. *Peduncles* and *pedicels* usually short (cf. f. *laxa*), 3—7 flowered. *Flowers*—June and July. *Calyx* campanulate, 5-nerved, the sutural nerves lacking or represented only by an occasional branch of the main nerves; teeth ovate, obtuse; persistent in fruit. *Petals* with unwinged claws, bifid limbs, and 2 small gibbous coronal ligules. *Stigmas*? 3—5. *Gynophore* short. *Capsule* globose, much longer than the gynophore. *Seeds* ∞, small, flat on the back.



Map 30. Distribution of *V. alpina* in Great Britain

First noticed as a British plant by George Don in 1795.

The differences between the plants from the Lake District and from Clova would seem almost certainly to be due to differences in habitat.

(*a*) forma **laxa** Compton in Moss *Camb. Brit. Fl.* iii, p. 69; *V. alpina* var. *laxa* Rouy et Foucaud *Fl. France* iii, 101 (1896).

*Stem* up to 30 cm. in height, with long internodes. *Peduncles* long.

The plants from the Lake District (Lancashire and Cumberland) show a tendency towards this *forma*; on rock-ledges, somewhat difficult of access.

(*β*) forma **frigida** Compton in Moss *Camb. Brit. Fl.* iii, p. 69; *Lychnis frigida* Schrank *Denkschr. Bot. Ges.* ii, 25 (1818); *V. alpina* var. *frigida* Rouy et Foucaud *loc. cit.*

*Shoot* dwarf and tufted. *Inflorescence* small, very dense. *Flowers* subsessile.

The plants from Clova, Forfarshire, show a tendency towards this *forma* (cf. Plate 68 *b*—*f*): it is here a scanty constituent of the plant-community of mountain-top detritus.

*V. alpina* is a rare British plant in danger of extinction by collectors; the Lake District—Lancashire (800 m.) and Cumberland (600 m.); Scotland—Forfarshire (1000 m.).

Iceland, Norway, Scandinavia, France (Alps and Pyrenees), central Europe (ascending to 2700 m. in the Tyrol), Ural mountains, Spain, Italy; Asia; North America (Labrador, Quebec, and Mexican Andes), Greenland.

## Tribe VI. *SILENEAE*

**Sileneae** Reichenbach *Handb. Natürl. Pflanzen.* 298 (1837).

For characters, see page 14.

### British genera of *Sileneae*

Genus 14. **Melandryum** (p. 70). *Calyx* more or less inflated, not membranous, with 5 primary and 5 sutural veins. *Petals* twisted in bud. *Gynophore* very short. *Stigmas* 3—8, usually 5 and antisepalous. *Capsule* without persistent septa.

Genus 15. **Silene** (p. 74). *Calyx* usually narrow, fitting close to the fruit, with 10—60 veins, veins anastomosing or not. *Petals* twisted in bud. *Gynophore* short. *Stigmas* 3. *Fruit* dry, with persistent septa below.

Genus 16. **Cucubalus** (p. 81). *Calyx* very broad, inflated, fitting loosely to the fruit, with 10—20 veins, veins anastomosing. *Petals* imbricate in bud. *Stigmas* 3—5. *Gynophore* conspicuous. *Fruit* dry or succulent, with persistent septa below.

## Genus 14. Melandryum

By R. H. COMPTON, M.A.

**Melandryum** Roehling *Deutschl. Fl.* [274 (1796) partim, nomen;] ed. 2, 37 (1812) emend. Fries in *Flora* xxvi, 122 (1843); Al. Braun in *Flora* xxvi, 370 (1843); Pax *op. cit.* p. 73; *Melanthium* Fries in *Bot. Notiser* 170 (1842); *Lychnis* L. *loc. cit.*, partim, incl. *Silene loc. cit.*, partim.

*Calyx* more or less inflated, not membranous, with 5 primary and 5 sutural veins, often with additional veins intercalated. *Petals* bifid, claw auricled, coronal ligules usually present. *Stamens* 10. *Gynophore* short. *Stigmas* 3—8, usually 3 or 5, when 5 then antisepalous. *Fruit* a capsule without persistent septa, dehiscing by twice as many teeth as there are stigmas. *Seeds* ∞, reniform.

About 60 species; northern hemisphere; South America (Andes); Cape Colony.

### Sections of *Melandryum*

Section I. **Eu-Melandryum** (see below). *Leaves* usually broad. *Flowers* almost always dioecious (but with rudiments either of stamens or of the pistil). *Stigmas* usually 5 (occasionally up to 8). *Capsule* dehiscing by 10 teeth, the septicidal splits occurring first and being deepest.

Section II. **Elisanthe** (p. 73). *Leaves* usually narrower. *Flowers* monoclinous. *Stigmas* usually 3.

### Section I. *EU-MELANDRYUM*

**Eu-Melandryum** A. Braun in *Flora* xxvi, 371 (1843); Pax, *op. cit.*, p. 73.

For characters, see above.

### British species and hybrid of *Eu-Melandryum*

1. **M. album** (see below). *Laminae* narrower and thicker than in *M. dioïcum*. *Petals* white. *Capsule* with teeth spreading slightly outwards but not rolled back. *Seeds* grey.

***M. album* × *dioïcum*** (p. 71). Plants intermediate between the parents, and usually occurring with or near them. *Petals* usually pink.

2. **M. dioïcum** (p. 72). *Laminae* broader and thinner than in *M. album*. *Petals* purplish-red, rarely white. *Capsule* with teeth rolled completely back when dry. *Seeds* brown.

### 1. MELANDRYUM ALBUM. White Campion. Plate 68

*Lychnis sylvestris alba* Gerard *Herball* 384 (1597); Johnson *Kent* 8 (1629); *L. sylvestris albo flore* Ray *Syn.* ed. 3, 339 (1724).

**Melandryum album** Garcke *Fl. N.- und M.- Deutschl.* ed. 4, 55 (1858); Rohrbach in *Linnaea* xxxvi, 209 (1869); *Lychnis dioïca* L. *Sp. Pl.* 437 (1753) partim; *L. alba* Miller *Gard. Dict.* ed. 8, no. 4 (1768); *L. dioïca* var. *alba* Weigel *Fl. Pom.* 85 (1769); *L. dioïca* var. *arvensis* Schkuhr *Handb.* i, 403, t. 124 (1791); *L. vespertina* Sibthorp *Fl. Oxon.* 146 (1794); *L. pratensis* Rafn *Danm. Holst. Fl.* 792 (1800); *L. dioïca* var. *β* Smith *Fl. Brit.* 495 (1800)!; *M. pratense* Röhling *Deutschl. Fl.* ed. 2, ii, 274 (1812); Rouy et Foucaud *Fl. France* iii, 94 (1896); *M. dioïcum* Cosson et Germain *Fl. Env. Paris* 28 (1845) non Schinz und Thellung; *Silene pratensis* Grenier et Godron *Fl. France* i, 216 (1847); Syme *Eng. Bot.* ii, 67 (1864).

Icones:—Smith *Eng. Bot.* t. 1580, as *Lychnis dioïca flore albo*; *Fl. Dan.* t. 792, as *L. dioïca*; Reichenbach *Icon.* vi, t. 304, fig. 5125, as *L. dioïca.*

*Camb. Brit. Fl.* iii. *Plate 68.* (*a*) Lower part of stem. (*b*) Branch with staminate flowers. (*c*) Stamens and rudimentary ovary of a pistillate plant attacked by *Ustilago violacea.* (*d*) Pistillate flower. (*e*) Ovary. (*f*) Persistent calyx containing ripening fruit. (*g*) Capsules. Cambridgeshire (E. W. H.).

Exsiccata:—Billot, 2816, 2816 bis, as *Lychnis vespertina*; Brotherus (*Pl. Cauc.*), 155 as *M. pratense*; Fiori et Beguinot (*Fl. Ital. Exsicc.*), 1269 et 1269 ter, as *L. alba*; *Herb. Fl. Ingric.*, i, 100, as *M. pratense.*

Biennial usually, sometimes perennial. *Shoot* erect or ascending, up to about 1 m. high, usually stouter than in *M. dioïcum*, with long hairs below and shorter glandular hairs above; main stems 1 or few, often with sterile axillary branches. *Laminae* elliptical-lanceolate, lower ones narrowed to the base, acute; upper ones sessile, base rounded; much thicker and narrower than in *M. dioïcum*,

usually greyish with dense short glandular hairs. *Inflorescence* dichasial, one of the lateral branches shorter than the other or even abortive. *Flowers* dioecious, very rarely monoclinous, somewhat nodding, faintly scented, opening in the evening and remaining open until the middle of the following day (or even rather longer in dull weather or in shady situations); late May to autumn. *Calyx* with glandular hairs, often tinged with anthocyanin, sometimes greenish, with lanceolate teeth; of the staminate flowers cylindrical, constricted above, with 10 veins; of the pistillate flowers tapering conically upwards from a dilated base, with up to 20 conspicuous and anastomosing veins, somewhat thicker than in the staminate flowers, distended or even broken in fruit. *Petals* white, rarely rose-coloured, larger in the pistillate than in the staminate flowers; limb bifid half-way down, sometimes with lateral lobelets; coronal ligules 2, long, fringed; claw long, exserted, auricled. *Stamens* within the tube, filaments hairy at the base, represented by staminodes in the pistillate flowers. *Ovary* green, in the staminate flowers represented by a slender thread which occasionally bears a stigma. *Capsule* broadly oval-conical, opening at the apex by 10 teeth which spread slightly outwards but which do not roll back, wall thicker and aperture narrower than in *M. dioïcum*. *Seeds* ∞, grey, black when wet, bluntly tuberculate, 1·5 mm. long.

The flowers are pollinated by night-flying moths.

For detailed observations on the flowers see Magnin (in *Ann. Soc. Bot. Lyon.* 203 (1889); *ibid.* 1 (1891)) and Goebel (*Biol. Centralbl.* 697 (1910)).

Plants with rose-coloured petals but with all other characters of the species are sometimes met with (= var. *coloratum* Rostrup in *Vidensk. Meddel. Nat. For. Kjöbenhavn*, pp. 82 et 117 (1864)): suspicion attaches to these being of hybrid origin.

(*β*) subvar. **laciniatum** Compton in *Camb. Brit. Fl.* iii, p. 71; *M. vespertinum* var. *laciniatum* Lange *Dansk. Fl.* ed. 3, 343 (1864).

*Petals* doubly bifid.

This subvariety occurs chiefly in pistillate flowers: the character fluctuates greatly on the same individual.

A weed of arable land, and in hedgerows; favouring a dry atmosphere and a rather light soil; demanding good illumination; almost throughout the British Isles, northwards to Orkney; ascending to about 300 m.

Europe (except Arctic, and ascending to 1715 m. in Switzerland); northern Africa; Asia; North America (not indigenous).

***M. album* × *dioïcum*** Compton in Moss *Cambr. Brit. Fl.* iii, 71; cf. *Lychnis dioïca* × *diurna* Reichenbach *Fl. Germ. Excurs.* 825 (1832); *M. pratense* × *sylvestre* Lamotte *Fl. Plat. Centr. Fr.* [ex *Mém. Acad. Clermont*] i, 131 (1877); *Lychnis alba* × *dioïca* Druce *Fl. Berksh.* 88 (1897); *M. album* × *rubrum* Gürke *Plant. Eur.* ii, 327 (1903).

The first generation hybrids ($F_1$) between *M. album* and *M. dioïcum* have been produced artificially by various workers; and plants essentially similar to these are frequently found growing wild with the parents. The reciprocal crosses produce $F_1$ hybrids which differ from one another in some slight particulars; but both crosses are matroclinous. The fullest account of these is that by Gagnepain (*Bull. Soc. Bot. France* xliii, 129 (1896); *ibid.* xliv, 441 (1897)). Segregation occurs in subsequent generations; and a whole series of intermediate forms occur. These however have as yet only been imperfectly studied.

Some of the intermediate forms have been given names as follow:—*L. dioïca* var. *intermedia* Gardiner *Fl. Forfarshire* 28 (1848); *M. dubium* Hampe ex Garcke *Fl. Nord- und M.-Deutschl.* ed. 6, 66 (1863); *M. intermedium* Schur *Pl. Transsilv.* 106 (1866); *M. hybridum* Brügger in *Jahresber. Naturf. Ges. Graubünd.* xxix, 55 (1886).

The descriptions of the above forms differ to some extent from one another; and the particular forms which have been described are no more worthy of being specially named than many others of hybrid origin. Moreover, the descriptions are not precise enough to enable one to associate them respectively with any hybrid-forms which have been produced experimentally.

(A) The $F_1$ hybrid.

Perennial. *Shoot* as strong as in *M. album*. *Petiole* more winged than in *M. album*. *Laminae* broader, not so thick as in *M. album*, less hairy and therefore greener, less undulate. *Flowers* appearing rather later than in *M. dioïcum*, earlier than in *M. album*. *Calyx* closely resembling that of *M. album*. *Petals* with somewhat exserted claws, expanding in the morning and remaining open all day even in bright sunlight, colour varying from pale rose early in the season to much darker rose in late summer. *Pollen* containing a considerable proportion of bad grains. *Ovules* ∞, good. *Capsule* more woody than in *M. dioïcum*, aperture narrower, teeth bent widely outwards but not rolled backwards when dry. *Seeds* tawny in *M. album* ♂ × *dioïcum* ♀, greyish-violet in *M. album* ♀ × *dioïcum* ♂.

(B) The $F_2$ generation contains about 25 per cent. of white-flowered plants (these subsequently breeding true to whiteness) and 75 per cent. of plants with flowers of varying degrees of anthocyanic pigmentation whose genetical nature has not yet been fully investigated.

The production of colour seems to depend on the presence of two Mendelian factors. Some white-flowered plants may lack one of these, some the other; and crosses between representatives of these two classes yield offspring with coloured petals.

The hybrid forms are distinguishable from the white-flowered form of *M. dioïcum* which may be a true albino subvariety, the occurrence of which is to be expected. The so-called red-flowered forms of *M. album* are open to suspicion of being of hybrid origin.

On the subject of the genetics of *M. album*, *M. dioïcum*, and *M. album* × *dioïcum*, the following additional references are given:—Gaertner *Vers. und Beob. über die Bastard. im Pflanzenr.* Stuttgart (1900); Godron in *Mém. Acad. Stanilas* 345 (1865); de Vries in *Ber. Bot. Ges.* xviii, 87 (1900); Bateson and Saunders in *Rep. Evol. Comm. Roy. Soc.* i, 15 (1901); de Correns in *Ber. Bot. Ges.* xxi, 145 (1903); Price in *Journ. Bot.* xlviii, 333 (1910); Shull in *Bot. Gaz.* xlix, 110 (1910); lii, 329 (1911); liv, 120 (1912); Correns *Die Vererb. und Best. des Geschl.* p. 19, Berlin (1913).

Somerset, Dorset, Kent, Berkshire, Cambridgeshire, Hertfordshire, Cheshire, Carnarvonshire, and doubtless elsewhere.

Scandinavia, Germany, Holland, France, central Europe, and doubtless elsewhere.

## 2. MELANDRYUM DIOÏCUM. Red Campion. Plate 69

*Lychnis sylvestris rubello flore* Gerard *Herball* 382 (1597); Ray *Syn.* ed. 3, 339 (1724).

**Melandryum dioïcum** Schinz und Thellung in *Bull. Herb. Boiss.* sér. 2, vii, 179 (1907) non Cosson et Germain; *Lychnis dioïca* L. *Sp. Pl.* 437 (1753) partim; Miller *Gard. Dict.* ed. 8, no. 3 (1768); *L. dioïca* var. *rubra* Weigel *Fl. Pom.* 85 (1769); *L. diurna* Sibthorp *Fl. Oxon.* 145 (1794); *L. dioïca* var. *a* Smith *Fl. Brit.* 495 (1800); *L. sylvestris* Rafn *Danm. Holst. Fl.* 790 (1800); *M. sylvestre* Roehling *Deutschl. Fl.* ed. 2, ii, 274 (1812); Rouy et Foucaud *Fl. France* iii, 97 (1896); *M. diurnum* Fries in *Bot. Notiser* 170 (1842); in *Flora* xxvi, 123 (1843); *M. rubrum* Garcke *Deutschl. Fl.* ed. 4, 55 (1858); *Silene diurna* Godron in *Mém. Soc. Sc. Nancy* 171 (1846); Grenier et Godron *Fl. France* i, 217 (1847); Syme *Eng. Bot.* ii, 69 (1864).

Perennial. *Shoot* with soft eglandular hairs. *Stem* more or less erect, often rather weak, branched above. *Leaves* dark green, broader and of thinner texture than in *M. album*. *Laminae* of the ground-leaves broadly lanceolate or elliptical, rapidly tapering to the long winged petiole, sometimes undulate, acute; of the stem, broadly elliptical or ovate, suddenly acuminate. *Bracts* like the leaves but smaller. *Inflorescence* dichasial. *Peduncles* usually elongate. *Flowers* dioecious, very rarely monoclinous, expanded during the whole day; May to autumn. *Calyx* with 5 teeth, reddish in colour, teeth triangular-acute and shorter than in *M. album*; of the staminate flowers cylindrical, 10-nerved; of the pistillate flowers more dilated, with up to 20 nerves, nerves anastomosing. *Petals* purplish-red, rarely white; limb bifid, coronal scales oblong, claw exserted and auricled. *Stamens* 10, represented by minute staminodes round the base of the ovary in the pistillate flowers. *Stigmas* 5, long, hairy. *Ovary* almost sessile, represented in the staminate flowers by a slender thread a few mm. long terminating the gynophore. *Capsule* spherical or broadly oval, thin-walled, dehiscing by 10 apical teeth which roll completely back when dry. *Seeds* ∞, brown, acutely tuberculate.

The flowers are mainly pollinated by day-flying Lepidoptera, and are also visited by bees and hover-flies.

A considerable excess of pistillate plants occurs in nature, as shown by several countings and experiments. For example, Strasburger (in *Biol. Centralbl.* xx, 657 (1900)) found among 14,000 plants near Bonn that the ratio of pistillate plants to staminate plants was about as 128 is to 100.

The staminate plants continue flowering far into autumn, sometimes even flowering in winter.

Monoclinous flowers occur very rarely: their hereditary behaviour has been investigated by Shull (*Bot. Gaz.* xlix, 110 (1910)).

Both *M. dioïcum* and *M. album* are frequently attacked by the smut *Ustilago violacea* whose spores replace the pollen of the anthers, causing a dingy violet stain on the petals. The presence of this fungal parasite causes a slight reduction in the size of the flowers. In staminate plants no other noteworthy change is produced; but in pistillate plants the attack of the fungus gives rise to a greater or less reduction in size or even to abortion of the ovary and stigmas, and causes the normally rudimentary staminodes to form stamens which however only serve to provide a receptacle for the spores of the fungus. This phenomenon has been investigated by many writers: see especially Magnin in *Ann. Soc. Bot. Lyon.* 203 (1889) and Strasburgher in *Biol. Centralb.* xx, 657 (1900).

(*a*) **M. dioïcum** var. **villosum** Compton in Moss *Camb. Brit. Fl.* iii, p. 72; *M. sylvestre* var. *villosum* Celakowsky *Prodr. Fl. Bohm.* 513 (1875).

Icones:—Smith *Eng. Bot.* t. 1579, as *Lychnis dioïca flore rubro*; Curtis *Fl. Lond.* i, 90, as *L. dioïca*; *Fl. Dan.* t. 2172, as *L. sylvestris*; Reichenbach *Icon.* vi, t. 304, fig. 5126, as *L. diurna*.

*Camb. Brit. Fl.* iii. *Plate 69.* (*a*) Portion of barren shoot. (*b*) Lower leaf. (*c*) Branch with pistillate flowers. (*d*) Branch with staminate flowers. (*e*) Petal. (*f*) Capsule with calyx adherent. (*g*) Capsule with calyx taken off. Jersey (E. W. H.).

Exsiccata:—Billot, 2026, 2026 bis, as *Silene diurna*; *Flor. Exsicc. Austr.-Hung.* 522, as *L. dioïca*; Fiori et Béguinot (*Fl. Ital. Exsicc.* ser. 2), 1271, as *L. rubra*; v. Hayek (*Fl. Stir. Exsicc.*), 1146 (with white flowers); Reichenbach, 2291, as *Lychnis nemoralis*; Willkomm (*It. Hisp. Sec.*), 27, as *M. sylvestre*; *Herb. Fl. Ingric.*, vi, 99, as *M. sylvestre*.

*Stem, leaves and branches* softly hairy (except in subvar. *alpestre*). *Stem* simple or slightly branched, often straggling or decumbent. *Laminae* of basal leaves elliptical; of stem-leaves broadly ovate, suddenly narrowed at base, soft, often drooping. *Flowers* in irregular clusters, shortly pedicelled. *Petals* usually red-magenta.

The usual form of the species.

(*β*) var. **villosum** subvar. **alpestre** Compton in Moss *Camb. Brit. Fl.* iii, 73; *M. diurnum* var. *alpestre* Fries ex Blytt *Norg. Fl.* 1070 (1876).

*Shoot* completely glabrous.

When crossed with the hairy plant, $F_1$ is hairy; and $F_2$ consists of hairy and glabrous plants in a ratio of about 3 to 1 (Bateson and Saunders *Reports Evol. Comm. Roy. Soc.* i, 15 (1902)).

(*γ*) var. **villosum** subvar. **villosissimum** Compton in Moss *Camb. Brit. Fl.* iii, 73; *M. sylvestre* var. *villosum* Rouy et Foucaud *op. cit.* p. 97.

*Shoot* densely hairy.

St Arvans, near Chepstow, Monmouthshire (Morgan, in Herb. Mus. Brit.).

(*b*) **M. dioïcum** var. **zetlandicum** Compton in Moss *Camb. Brit. Fl.* iii, p. 73.

*Stem* simple, very stout, erect, densely hairy. *Petioles* of the basal leaves narrow, broadening very suddenly to the laminae. *Laminae* of the basal leaves broadly elliptical; of the stem-leaves broadly ovate or elliptical, soft and very downy on both surfaces. *Bracts* much larger than in var. *villosum*. *Flowers* in a dense subsessile terminal cluster and in the axils of the uppermost leaves, larger than in var. *villosum*. *Petals* of a darker purple.

This is a very striking plant, looking very distinct from var. *villosum*; but it is not so far known to breed true.

Zetland—Noup of Noss (W. E. and H. Smith, Herb. Mus. Brit.), Green Holm, Scalloway (Straker, Herb. Mus. Brit.), Binnafirth, Unst, and Tetlar, Mid Yell (Beeby, herb. South Lond. Bot. Inst., no. 107 et no. 111), Unst (Tate, Herb. Univ. Cantab.).

(*c*) ***M. dioïcum** var. **glaberrimum** Compton in Moss *Camb. Brit. Fl.* iii, p. 73; *Lychnis diurna* var. *glaberrima* Sekera ex Maly *Enum. Pl.* 310 (1848) nomen; *L. presli* Sekera *Oest. Bot. Wochenbl.* iii, 196 (1853); in *Lotos* iii, 133 (1853); *M. presli* Nyman *Syll. Suppl.* 41 (1865); *M. rubrum* var. *glaberrimum* Rohrbach in *Linnaea* xxxvi, 213 (1870).

Exsiccata:—Sekera, in Herb. Kew, as *Lychnis presli*; Miss A. Trower, in Herb. Kew, as *L. presli*.

Differs from var. *villosum* in the following characters. *Rhizome* giving off numerous stiff, erect, and almost unbranched stems. *Shoot* more compact and bushy, completely glabrous. *Petioles* of the ground-leaves long, of the stem-leaves absent. *Laminae* of the ground-leaves elliptical-lanceolate; of the stem-leaves broadly oval, abruptly acuminate, standing out more stiffly than in var. *villosum*. *Petals* rather darker in colour.

Near Tantallon Castle, Haddingtonshire (Miss A. Trower; see *B.E.C. Rep. for 1911*, iii, pt. i, p. 13 (1912)).

Bohemia.

Abundant over most parts of the British Isles; a frequent constituent in oak woods, ash-oak woods, and ash woods where the soil is moist and fresh; locally abundant in damp shady hedgerows and on stream-banks; avoiding both moors and fens; preferring soils at least moderately rich in mineral salts; demanding a greater degree of shade and a heavier rainfall than *M. album*; absent or quite rare in and near Cambridgeshire and Huntingdonshire where the rainfall is low and the soils very dry in summer, and absent over considerable tracts of central Ireland; favouring hilly districts, but ceasing to be plentiful at about 300 m. though ascending to 850 m. in the Highlands in sheltered corries and niches.

Faeröes, Scandinavia, Germany, Denmark, Holland, Belgium, France, central Europe (ascending to 2364 m. in the Tyrol), Russia, southern Europe (except southern Italy and Greece); northern Africa; Asia; North America (not indigenous).

## Section II. *ELISANTHE*

**Elisanthe** Fenzl in Endlicher *Gen. Pl.* 972 (1841).

For characters, see page 70. Only British species:—*M. noctiflorum*.

### 3. MELANDRYUM NOCTIFLORUM. Night-flowering Catchfly. Plate 70

*Lychnis noctiflora* Parkinson *Theatr. Bot.* 632 (1640); Ray *Hist.* 994 (1688); *Syn.* ed. 3, 340 (1724); *L. frutescens noctiflora* Morison *Pl. Hist.* ii, 538, t. 20 (sect. 5), fig. 12 (1680).

**Melandryum noctiflorum** Fries [in *Bot. Notiser* 170 (1842) as *Melanthium*, transl. et emend.] in *Flora*

xxvi, 122 (1843)!; Rohrbach in *Linnaea* xxxvi, 242 (1869); Rouy et Foucaud *Fl. France* iii, 98 (1896); *Silene noctiflora* L. *Sp. Pl.* 419 (1753)!; Smith *Eng. Bot.* no. 291 (1795)!; *Fl. Brit.* 470 (1800); Syme *E. B.* ii, 66 (1864).

Icones:—Smith *Eng. Bot.* t. 291, as *Silene noctiflora*; *Fl. Dan.* t. 2470, as *S. noctiflora*; Reichenbach *Icon.* vi, t. 276, fig. 5063, as *S. noctiflora.*

*Camb. Brit. Fl.* iii. *Plate 70.* (*a*) Flowering shoot. (*b*) Leaf. (*c*) Capsules. Huntingdonshire (E. W. H.).

Exsiccata:—Billot, 1436, as *Silene noctiflora*; Don, 12, as *S. noctiflora*; Fries, ix, 37; Reichenbach, 1994, as *S. noctiflora*; Thielens et Devos, ii, 106, as *S. noctiflora*; *Herb. Fl. Ingric.* vi, 96, as *S. noctiflora.*

Annual. *Shoot* more or less covered with shaggy greyish multicellular hairs which are specially abundant on the calyx and leaf-veins, the upper part characterised by shorter glandular down causing the marked viscidity of the plant. *Stem* erect, terete, usually simple. *Petioles* present in the lower and middle leaves. *Laminae* slightly connate, entire, not undulate, dull green; lower ones obovate or oblong-spathulate; middle ones narrowed at the base; upper ones sessile, lanceolate-acute, broad-based. *Inflorescence* dichasial, terminal. *Flowers* monoclinous; July to September. *Calyx* clavate, with long subulate teeth which before flowering are longer than the tube; with 5 stronger and 5 weaker prominent anastomosing green veins, the parts without veins whitish; distended and often burst by the growing capsules. *Petals* white on the inner side, pale flesh-coloured or rosy, sometimes pale yellow underneath; rolling inwards during the day, expanding in the evening; the limbs bipartite, the lobes of the limbs oblong; coronal ligules 2; claw narrow, auricled, slightly exserted. *Gynophore* short. *Capsule* large, narrowly ovate, conical, 6—8 times as long as the gynophore; teeth 6, recurved on dehiscence. *Seeds* about 1·2 mm. long, grey-brown, slightly furrowed on the bark, flattened on the sides, surface granulate.

A weed of arable land; locally abundant in south-eastern England, becoming rarer northwards (to Perthshire and Forfarshire) and westwards; Wales—Denbighshire and Flintshire; Ireland—"chiefly in sandy fields on the east coast" (Praeger *Irish Top. Bot.* p. 53); preferring light soils.

Europe (except Arctic and sub-Arctic); Asia; North America (not indigenous).

## Genus 15. Silene

**Silene** L. [*Gen. Pl.* 132 (1737);] *Sp. Pl.* 416 (1753) et *Gen. Pl.* ed. 5, 293 (1754) emend.; S. F. Gray *Nat. Arr. Brit. Plants* ii, 646 (1821). [*Viscago* Dillenius *Hort. Eltham.* 416 (1732).]

Perennial or annual herbs. *Petals* with a cuneiform claw and a spreading limb. *Stamens* 10. *Stigmas* 3. *Capsule* dehiscing by twice as many valves or teeth as there are stigmas, carpellary septa more or less persistent in the lower part and the capsule thus apparently multilocular below. *Seeds* reniform or globular. *Embryo* almost annular or semicircular. *Cotyledons* incumbent.

This genus, as we (following S. F. Gray) understand it, differs from *Melandryum* chiefly in the persistent, carpellary septa, and from *Cucubalus* in the non-baggy calyx.

Grenier and Godron united *Melandryum*, *Silene* (S. F. Gray), and *Cucubalus* (S. F. Gray) into a single genus, their *Silene*, and were followed by Syme. We are in full agreement with Mr F. N. Williams (*loc. cit.*) and with our contributor, Mr Compton, in subdividing *Lychnis*, as formerly understood in this country, according to continental authorities.

About 300 species; cosmopolitan.

### Sections of *Silene*

Section I. **Conoïmorpha** (see below). Annual. *Calyx* ovate in flower, more or less swollen below in fruit, with 20—60 veins, not anastomosing.

Section II. **Eu-Silene** (p. 76). Perennial or annual. *Calyx* ovate or narrowly elliptical when in flower, not much swollen in fruit, with 10—20 unequal veins, veins anastomosing at the summit.

### Section I. *CONOÏMORPHA*

**Conoïmorpha** Otth in DC. *Prodr.* i, 371 (1824); Grenier et Godron *Fl. France* i, 204 (1847); Syme *Eng. Bot.* ii, 58 (1864); *Conosilene* Rohrbach *Monogr.* 67 et 89 (1868); Rouy et Foucaud *Fl. France* iii, 110 (1896); Williams in *Journ. Bot.* xxxii, 13 (1894).

For characters, see above.

#### British species of *Conoïmorpha*

1. †**S. conoïdea** (p. 75). *Bracts* larger than in *S. conica*, connate. *Flowers* about 1·5 cm. in diameter. *Capsule* ventricose at the base, suddenly narrowed above, with teeth half as long as the rest of the capsule.

2. **S. conica** (p. 75). *Bracts* smaller, not connate. *Flowers* about 0·5 to 1·2 cm. in diameter. *Capsule* ovoid-conical, with teeth a quarter as long as the rest of the capsule.

## 1. †SILENE CONOÏDEA. Plate 71

**Silene conoïdea** L. *Sp. Pl.* 418 (1753)!; Grenier et Godron *Fl. France* i, 205 (1847); Rouy et Foucaud *Fl. France* iii, 110 (1896); non Hudson nec Reichenbach.

Icones:—Reichenbach *Icon.* vi, t. 276, fig. 5062, as *S. conica.*

*Camb. Brit. Fl.* iii. *Plate 71.* (*a*) Whole plant. (*b*) Upper part of a plant. (*c*) Petal. (*d*) Petal and stamen. (*e*) Capsule. Jersey (E. W. H.).

Exsiccata:—Bourgeau (*Pl. d'Esp.*), 965 et 2256; Lange, 370.

A larger plant than *S. conica* to which it is closely allied. *Shoot* pubescent-glandular or glabrescent. *Leaves* larger, connate. *Lowest* pair of bracts much larger, connate. *Calyx* at maturity strongly ventricose at the base, suddenly acuminate above. *Flowers* about 1·5 cm. in diameter; June and July. *Petals* rose-coloured, entire or bifid. *Capsule* ventricose at the base, suddenly acuminate, teeth half as long as the rest of the fruit, acuminate. *Seeds* black.

Jersey (E. W. Hunnybun); adventitious elsewhere, as in Berkshire.

Western Germany (not indigenous); Mediterranean region, including Algeria, and eastwards to India.

## 2. SILENE CONICA. Plate 72

*Lychnis sylvestris angustifolia caliculis turgidis striatis* Dillenius in Ray *Syn.* ed. 3, 341 (1724).

**Silene conica** L. *Sp. Pl.* 418 (1753)!; Smith *Fl. Brit.* 470 (1800)!; Grenier et Godron *Fl. France* i, 204 (1847); Syme *Eng. Bot.* ii, 58 (1864); Rouy et Foucaud *Fl. France* iii, 110 (1896); *S. conoïdea* Hudson *Fl. Angl.* 165 (1762) non L.

Icones:—Smith *Eng. Bot.* t. 922; Reichenbach *Icon.* vi, t. 275, fig. 5071, as *S. conoïdea.*

*Camb. Brit. Fl.* iii. *Plate 72.* (*a*) Plant in flower. (*b*) Plant in fruit. (*c*) Petals (one enlarged). (*d*) Capsules with persistent calyx. Suffolk (C. E. M.).

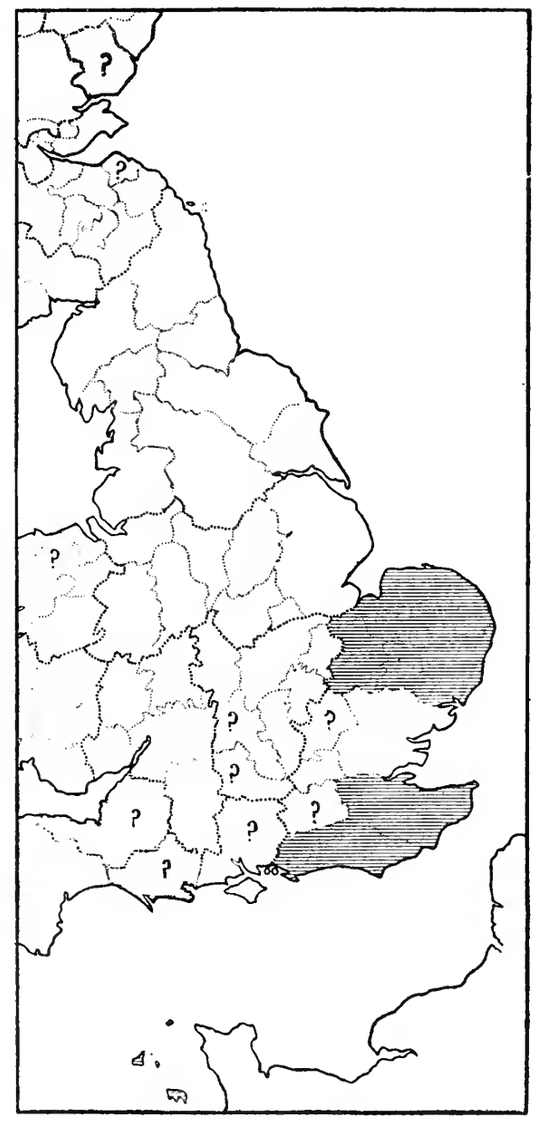
Exsiccata:—Billot, 514; Bourgeau (*Pyr. Esp.*), 222; Dickson, xviii, 11; Lange, 369; Noë, 277; Orphanides, 1129; Todaro, 680.

Annual. *Shoot* 1—3 dm. high, grey with short pubescence, more or less glandular above. *Laminae* linear-lanceolate, acute to acuminate, lowest ones attenuate below, those of the stem a little connate. *Bracts* herbaceous, acuminate, lowest pair not or scarcely connate. *Flowers* about 5—12 mm. in diameter; late May to August. *Calyx* ovate-conical at maturity, somewhat ventricose at the base, segments acuminate. *Petals* rose-coloured, bifid; coronal scales, bipartite. *Anthophore* very short, broader than long. *Capsule* ovoid-conical, shorter than the calyx, teeth about a quarter as long as the rest of the calyx. *Seeds* punctate, about 0·75 mm. in diameter.

This plant is recorded for many counties, but is more or less sporadic or adventitious in most of them. It may, however, be indigenous in Forfarshire.

Local and rather rare; sandy soil (including sand-dunes) in sunny situations where the soil is not acidic, in southern and eastern England.

Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; Algeria; Asia; North America (not indigenous).



Map 31. *Silene conica* is probably indigenous in the counties which are shaded, and more or less doubtfully so in those marked with a "?"

## Section II. *EU-SILENE*

**Eu-Silene** Godron in *Mém. Soc. Nancy* for 1846, 164 (1847); Grenier et Godron *Fl. France* i, 205 (1848); Rohrbach *Monogr.* 67 et 89 (1868).

For characters, see page 74.

### British species of *Eu-Silene*

3. **S. acaulis** (see below). Perennial, tufted. *Flowers* solitary, erect. *Calyx* campanulate. *Petals* with the coronal-scale emarginate. *Capsule* with imperfect partitions.

4. †**S. armeria** (p. 77). Annual. *Inflorescence* many-flowered. *Flowers* rather crowded, shortly pedicelled.

5. **S. anglica** (p. 78). Annual. *Claw of petals* not auricled. *Calyx* cylindrical. *Pedicels* ultimately rather long. *Flowers* erect. *Filaments* hairy below. *Capsule* subsessile.

6. ***S. dichotoma** (p. 78). Annual. *Flowers* erect at anthesis. *Calyx* elongate. *Gynophore* short. *Coronal scales* laciniate.

7. **S. nutans** (p. 79). Annual. *Flowers* nodding. *Calyx* elongate, broadest above. *Petals* deeply bifid. *Filaments* glabrous, exserted. *Calyx* with lanceolate teeth, claviform, truncate at the base. *Gynophore* distinct, with short hairs, directed downwards.

8. ***S. italica** (p. 80). Perennial. *Flowers* erect. *Calyx* elongate, contracted at the summit; segments obtuse. *Petals* bifid. *Inflorescence* lax, few-flowered. *Gynophore* long.

9. **S. otites** (p. 81). Annual. *Flowers* erect at anthesis. *Calyx* short, not contracted at the summit. *Flowers* small, in compound racemes or verticels. *Petals* entire, yellow, without scales. *Gynophore* short.

## 3. SILENE ACAULIS. Moss Campion. Plate 73

*Caryophyllus pumilio alpinus* Johnson in Gerard *Herball*, ed. 2, 593 (1636); *Ocimoïdes muscosus alpinus* Parkinson *Theatr. Bot.* 639 (1640); *C. montanus minimus sive c. pumilio alpinus* Johnson *Merc. Bot.* ii, 18 (1641); *Lychnis alpina pumila folio gramineo* C. Bauhin *Pinax* 206 (1671); Dillenius *Hort. Eltham.* 206, fig. 206 (1732); *L. alpina minima* Ray *Hist.* ii, 1004 (1688); *Syn.* ed. 3, 341 (1724).

**Silene acaulis** L. *Sp. Pl.* ed. 2, 603 (1762)!; Smith *Fl. Brit.* 472 (1800)!; Syme *Eng. Bot.* ii, 62 (1864); Rouy et Foucaud *Fl. France* iii, 128 (1896); *Cucubalus acaulis* L. *Sp. Pl.* 415 (1753).

Icones:—Smith *Eng. Bot.* t. 1081; *Fl. Dan.* t. 21; Reichenbach *Icon.* vi, t. 270, fig. 5084.

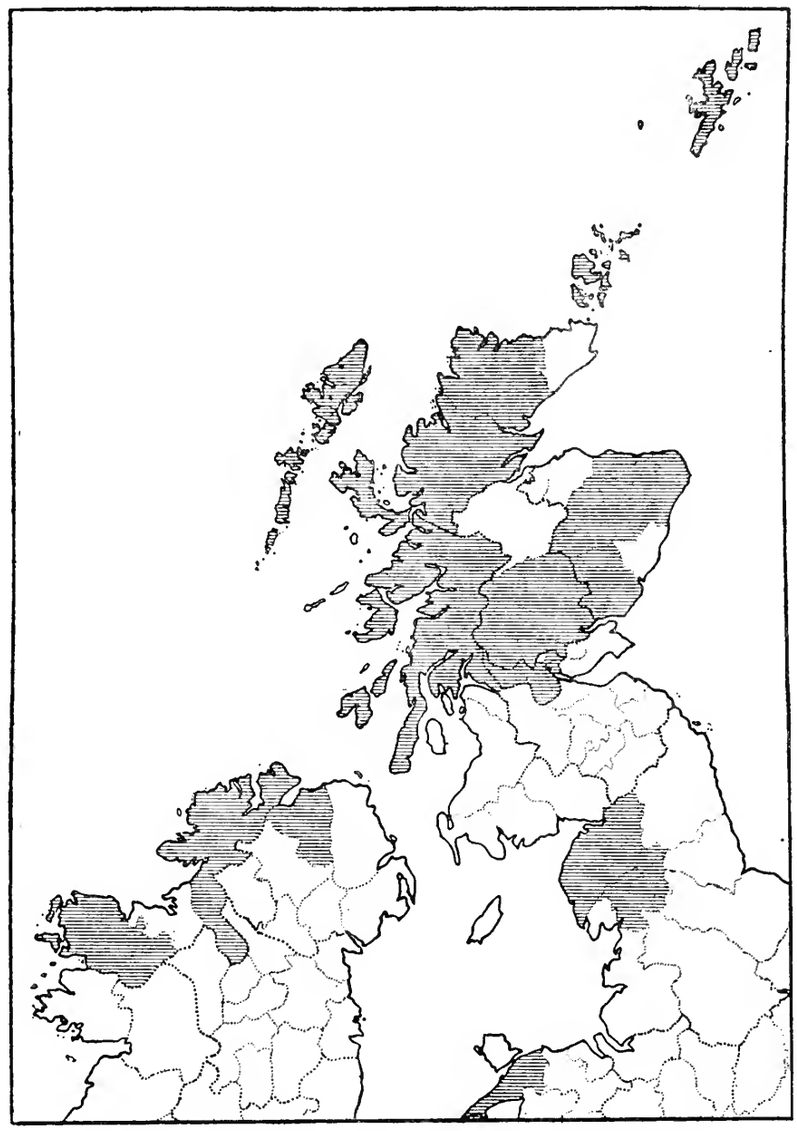
*Camb. Brit. Fl.* iii. *Plate 73.* (*a—f*) Fertile shoots. (*g*) Leaf (enlarged), lower surface. (*h*) Leaf (enlarged), upper surface. (*i*) Petal (enlarged). (*j*) Petal (side view) and stamen (enlarged). (*k*) Ovary (enlarged). (*l*) Capsule (enlarged). Forfarshire (E. S. M.).

Exsiccata:—Bourgeau (*Pyr. Esp.*), 224; Dickson, i, 8; Duchartre, 45; Fellman, 35; Fries, xi, 40; xv, 39; Lange, 378; Reichenbach, 394.

Perennial, more or less strongly caespitose. *Roots* deep. *Stem* stout and much branched from the base, giving rise to numerous barren shoots and short fertile branches. *Branches* 2—10 cm. long. *Leaves* sessile, linear, ciliolate, acute or acuminate, shining, up to 1·5 cm. long. *Inflorescence* solitary. *Bracts* leaf-like. *Pedicels* up to 2·0—2·5 cm. long in fruit. *Flowers* often hemi-dioecious, solitary, erect; June to August. *Calyx* gamosepalous, campanulate, somewhat umbilicate at the base, faintly veined, veins not anastomosing, purplish, segments obtuse. *Petals* rose or rarely white, coronal scale emarginate, limb obovoid, entire or notched. *Gynophore* pubescent, shorter than the capsule. *Stamens* longer than the claw. *Ovary* elliptical. *Stigmas* 3, as long as the ovary. *Capsule* elliptical, much longer than the calyx, pubescent, 6-toothed, with narrow imperfect partitions. *Seeds* yellow, punctulate.

This is one of the most abundant as well as one of the most beautiful of our Arctic-Alpine species. It descends to quite low levels in some of the warmer and more humid parts of its British area of distribution.

On damp rocks and débris, usually in Alpine and sub-Alpine situations; locally abundant in Carnarvonshire, the Lake District, central and northern Scotland to Zetland, and north-western Ireland; ascending to 1214 m. in Perthshire and descending to 122 m. on Clare Island, co. Mayo.



Map 32. Distribution of *Silene acaulis* in the British Islands

The Faeröes, Iceland, northern and Arctic Europe, mountains of central and southern Europe ascending to 2870 m. in Switzerland; Asia; Arctic and northern America (incl. Greenland).

## 4. †SILENE ARMERIA. Lobel's Catchfly. **Plate 74**

*Muscipula lobelii* Gerard *Herball* 481 (1597); *Lychnis viscosa purpurea latifolia laevis* C. Bauhin *Pinax* 205 (1671); Dillenius in Ray *Syn.* ed. 3, 341 (1724).

**Silene armeria** L. *Sp. Pl.* 420 (1753)!; Smith *Fl. Brit.* 471 (1800)!; Syme *Eng. Bot.* ii, 61 (1864); Rouy et Foucaud *Fl. France* iii, 131 (1864).

Icones:—Smith *Eng. Bot.* t. 1398; *Fl. Dan.* t. 559; Baxter *Phaen. Bot.* ii, t. 120; Reichenbach *Icon.* vi, t. 284, fig. 5079.

*Camb. Brit. Fl.* iii. *Plate 74.* (*a*) Plant in flower. (*b*) Petals (one enlarged). (*c*) Ovaries (one enlarged) Worcestershire—adventitious (S. H. B.).

Exsiccata:—Billot, 937; Fries, x, 39; Reichenbach, 2287; Schultz et Winter, i, 19.

Annual. *Shoot* glabrous, rather glaucous, more or less viscous. *Stem* 1—4 dm. high. *Leaves*—lower ones spathulate; upper ones lanceolate-acute. *Bracts* linear. *Inflorescence* rather dense,

many-flowered. *Pedicels* short. *Flowers* erect; June to August. *Calyx* elongate, umbilicate, with anastomosing veins. *Petals* rose-coloured or crimson, limb with two free subulate coronal scales. *Gynophore* glabrous, as long as the capsule. *Capsule* cylindrical. *Seeds* with flat sides, punctulate.

Rare; sand-dunes, hedge-banks, and cornfields; Cornwall, Devonshire, Surrey, Berkshire, Cheshire; adventitious as a rule, and probably not indigenous at all in England.

Naturalised in Sweden and Denmark; Germany, Belgium, France, central Europe, Russia, southern Europe; North America (not indigenous).

## 5. SILENE ANGLICA. Corn Catchfly. Plate 75

*Lychnis segetum parva viscosa flore albo* Johnson *Merc. Bot.* 49 (1634); *L. sylvestris annua angustifolia flore rubente* Ray *Cat. Angl.* 202 (1670); *Viscago cerastei foliis vasculis pendulis anglica* Dillenius *Hort. Eltham.* 417, t. 309 (1732).

**Silene anglica** L. *Sp. Pl.* 416 (1753)!, incl. *S. gallica* p. 417!, et incl. *S. quinquevulnera* p. 417!; Smith *Fl. Brit.* 465 (1800)!, incl. *S. quinquevulnera* p. 466!; *S. gallica* [L. *loc. cit.*, emend.] Syme *Eng. Bot.* ii, 59 (1864); Rouy et Foucaud *Fl. France* iii, 119 (1896).

Icones:—Smith *Eng. Bot.* t. 86, as *S. quinquevulnera*; t. 1178, as *S. anglica*; Curtis *Fl. Lond.* i, t. 85, as *S. anglica*; Reichenbach fil. *Icon.* vi, t. 272, fig. 5054, as *S. gallica*; fig. 5055, as *S. sylvestris*; fig. 5055, as *S. sylvestris* var. *quinquevulnera*; t. 273, fig. 5056, as *S. anglica.*

*Camb. Brit. Fl.* iii. *Plate 75.* (*a*) Upper part of plant of "var. *gallica.*" (*b*) Upper part of plant of "var. *quinquevulnera.*" (*c*) Petals of "var. *gallica*" (one enlarged). (*d*) Petals of "var. *quinquevulnera*" (one enlarged). (*e*) Petals of "var. *rosea*" (one enlarged). Jersey (E. W. H.).

Exsiccata:—Billot, 2627, 3341; Dickson, xiii, 18; xviii, 12, as *S. quinquevulnera*; Fries, vii, 32; v. Heurck, i, 19; Huter, 1092, as *S. gallica* var.; Reichenbach, 497; Thielens et Devos, ii, 105; Todaro, 375, as *S. candollii.*

Annual. *Shoot* hairy or pubescent. *Stem* erect or ascending, up to 4 dm. high. *Branches* ascending or spreading. *Lower leaves* narrowly obovate. *Inflorescence* dense or lax. *Pedicels* ultimately about as long as the fruiting calyx. *Flowers* erect; May to September. *Calyx* cylindrical, not umbilicate at the base, with 10 prominent veins, veins not anastomosing. *Petals* white or rose or variegated with a red centre, entire to bifid, with two coronal out-growths. *Stamens* 10; filaments hairy below. *Gynophore* very short. *Capsule* cylindrical-ovoid, shorter than the calyx, sessile or very nearly so, capsule-teeth long. *Seeds* punctate, reniform, about 0·75 mm. in the longer diameter.

The Jersey forms of this variable species have been investigated by Mr J. Cosmo Melvill (in *Journ. Bot.* xviii, 146 (1880)). Mr Melvill states that there are two varieties of this species, that these hybridise, and that three colour-forms of one of the varieties occur. Jordan and Fourret (*Brev. Pl.* i, 4—9 (1866)) distinguish several *petites espèces*; but the forms of southern England do not seem to have been compared with those which occur in France. These forms differ in habit, the degree of hairiness, the branching, the shape of the leaves, the size and colour of the petals, the shape of the coronal scales, the length of the gynophore, and the shape and orientation of the capsule. The species of Jordan and Fourret have been reduced to varieties by Rouy and Foucaud (*Fl. France* iii). Altogether the latter authorities describe 14 French forms. Probably several of these occur in southern England and in the Channel Isles. Possibly the different forms are largely due to hybridisation and factorial segregation; but no experiments seem to have been conducted with a view of testing this hypothesis. Until these numerous forms have been grown under cultural and experimental conditions, we doubt if it is possible to arrange them satisfactorily.

Local; a weed of cornfields and waste places on light soils in lowland districts; from Jersey, Cornwall and Kent northwards to Elginshire; Ireland, co. Galway; adventitious in most of its stations in the north of England and Scotland.

Denmark, Holland, France, central Europe, Russia, southern Europe; northern Africa; south-western Asia. Adventitious in most warm-temperate countries of the world, including North America.

## [6. *SILENE DICHOTOMA]

**Silene dichotoma** Ehrhart *Beitr.* vii, 143 (1792)!, non Gilibert; Rouy et Foucaud *Fl. France* iii, 111 annot. (1896).

Icones:—Sibthorp and Smith *Fl. Graec.* t. 413; Reichenbach *Icon.* vi, t. 280, fig. 5071.

Exsiccata:—Ehrhart (*Pl. Sal.*), 65; Noë, 200; Paillot (*Fl. Sequan.*), 413.

Annual. *Shoot* minutely pubescent, branches dichotomous. *Lower leaves* spathulate, upper ones lanceolate. *Upper leaves* lanceolate-acuminate. *Peduncles* short. *Flowers* erect. *Calyx* elongate. *Petals* normally white, with the coronal scales laciniate. *Gynophore* very short. *Capsules* oblong. *Seeds* tuberculate.

A weed of waste ground, sainfoin and clover fields, "increasing in frequency" (Druce *Fl. Berksh.* 85 (1897); local and not indigenous, from Jersey northwards to Anglesey and Suffolk.

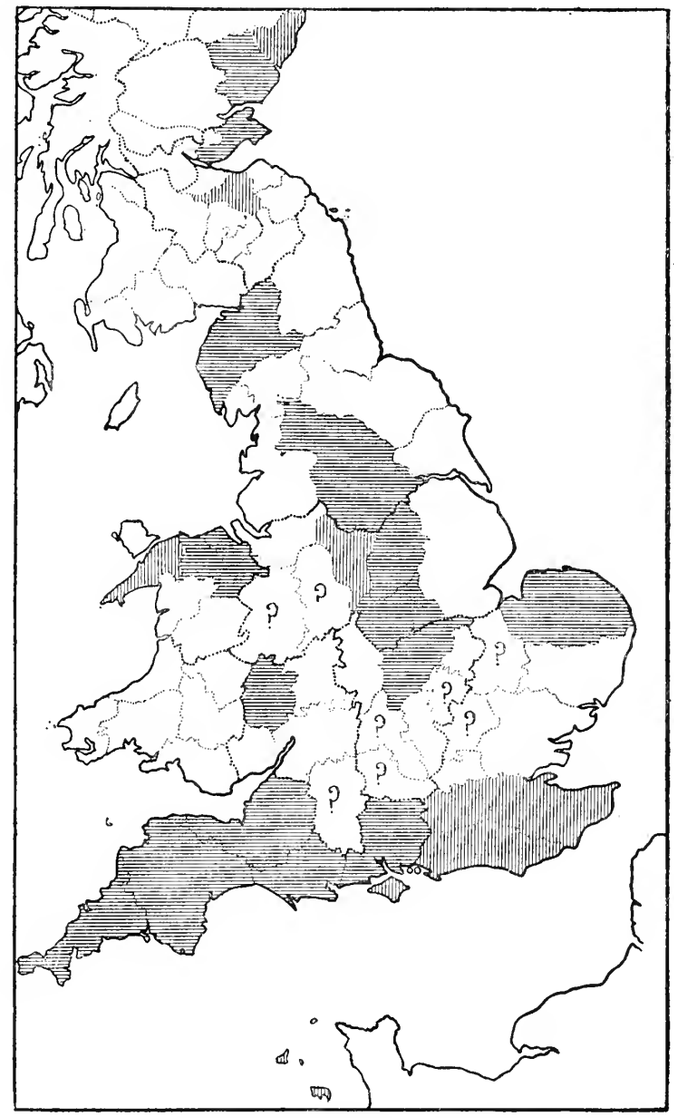
Adventitious in Denmark, Germany, Holland, France, and Switzerland. Indigenous in Austria-Hungary, Russia (central and southern), and south-eastern Europe; Algeria; south-western Asia; North America (not indigenous).

## 7. SILENE NUTANS. Nodding Catchfly. Plates 76, 77

*Lychnis sylvestris alba nona clusii* Johnson in Gerard's *Herball* ed. 2, 470 (1633); Ray *Syn.* ed. 3, 340 (1724); Deering *Cat. Stirp.* 137 (1738).

**Silene nutans** L. *Sp. Pl.* 417 (1753)!; Smith *Eng. Bot.* no. 465 (1798)!; *Fl. Brit.* 466 (1800); incl. *S. paradoxa*, p. 467; Syme *Eng. Bot.* ii, 64 (1864); Rouy *Fl. France* iii, 143 (1896).

Perennial. *Shoot* usually pubescent-glandular; barren shoots short; fertile shoots eventually erect, 2—5 dm. high. *Stem* nodding before the flowers are fully expanded; branches more or less divaricate, up to about 5 cm. long. *Lower leaves* more or less spathulate; laminae gradually or abruptly attenuate into a long petiole, elliptical (most of the British examples) to suborbicular (in var. *spathulifolia* Burnat *l.c.*). *Stem-leaves* nearly or quite sessile, narrowly spathulate or elliptical or ovate-lanceolate, acute. *Peduncles* nodding in flower. *Pedicels* shorter than the calyx, up to about 1 cm. long. *Bracts* smaller than the leaves. *Flowers* open and fragrant in the evening, closed and inodorous during the day-time, dimorphous, up to 2·5 or even 3·0 cm. in diameter; June to early August. *Calyx* glandular, usually more or less purplish, subumbilicate, much longer than the teeth, about 2 cm. long, teeth very short (2 mm.). *Petals* white to yellowish white or pale reddish; limb nearly as long as the claw, deeply bifid, lobes somewhat spreading, coronal scales short and acute, claw not auricled. *Stamens* 10; filaments long (2·0—2·5 cm.), protruding, white; anthers greenish. *Gynophore* about twice as long as the ovary and about a third as long as the capsule. *Ovary* about 5 mm. long. *Capsule* ovate-conical.




Map 33. *Silene nutans* occurs in the counties which are shaded, and more or less doubtful records occur regarding the counties marked with a "?"

(*a*) **S. nutans** var. **vulgaris** nobis; *S. nutans* L. herb. et *Sp. Pl.* et auct. (incl. Herbich *loc. cit.*), in sensu stricto; *S. dubia* Salmon in *Journ. Bot.* xliii, 127 (1905) non Herbich.

Icones:—Reichenbach *Icon.* vi, t. 295, fig. 5108.

*Camb. Brit. Fl.* iii. *Plate 76.* (*a*) Lower leaves. (*b*) Flowering branch. (*c*) Petals (enlarged). (*d*) Capsules (enlarged). (*e*) Fruiting branch. Jersey (E. W. H.).

Exsiccata:—Billot, 729; Bourgeau (*Pyr. Esp.*), 223, as *S. nutans* var. *viridella*; Don, 110; Fries, iv, 50, as *S. nutans* var. *β*; v. Heurck et Martinis, vi, 252; Vendely, 316; Welwitsch (*Fl. Lusit.*), 886, as *S. longicilia*; Wirtgen, vi, 97, as *S. nutans* var. *hirsuta.*

More slender and graceful and less viscid and hairy than var. *smithianus*. *Lower leaves* with longer petioles, laminae narrower, more gradually attenuate at the base. *Stem-leaves* narrower, acute. *Inflorescence* nodding. *Calyx* narrower, with more acute and longer segments than in var. *smithianus*. *Petals* pale cream-coloured, more reflexed than in var. *smithianus*. *Gynophore* about 4 mm. long. *Capsule* with more strongly reflexed teeth than var. *smithianus*, 10·0—11·5 mm. long. *Seeds* greyish-black, with rather blunt tubercles, longer than broad, slightly larger than in var. *smithianus*, about 1·2—1·3 mm. long.

This is the common British plant.

(*b*) †**S. nutans** var. **smithianus** nobis; *Cucubalus viscosus* Hudson *Fl. Angl.* 163 (1762) non L., excl. diagn. et syn.; *S. paradoxa* Smith *Fl. Brit.* 467 (1800) non L., excl. syn. Jacquin et Zannoni; *S. nutans* var. *β* Smith *Eng. Fl.* ii, 297 (1824); ? *S. dubia* Herbich *Fl. Bucov.* 388 (1859), non Salmon *loc. cit.*; *S. nutans* Salmon *loc. cit.*, in sensu stricto.

Icones:—Smith *Eng. Bot.* t. 465, as *S. nutans*.

*Camb. Brit. Fl.* iii. *Plate 77*. (*a*) Ground-leaves. (*b*) Flowering shoot. (*c*) Portion of stem. (*d*) Petal. Kent (J. G. McD.).

Exsiccata:—Don, 110, as *S. nutans*.

A coarser, stouter, more viscid, and hairier plant than var. *vulgaris*. *Leaves* broader, less acute. *Inflorescence* less drooping. *Calyx* with less acute teeth. *Petals* white. *Gynophore* about 2·0—2·5 mm. long, a little shorter than the capsule. *Capsule* with suberect teeth, 8—9 mm. long. *Seeds* with acute tubercles, greyish black, a little longer than broad, about 1 mm. long.

The plant from which the plate in *Eng. Bot.* ed. 1, t. 465 was drawn came from Nottingham. Smith was not satisfied that the plant represented *S. nutans*, for he wrote to Sowerby that the "panicle ought to be rather more drooping and the flowers pointing all one way" (see *Journ. Bot.* xli, suppl. 31 (1903)). There can, however, be no doubt that Sowerby correctly delineated the plant he had before him and which we name *S. nutans* var. *smithianus*. Specimens sent to us by Professor Carr, which originally grew on the walls of Nottingham castle, belong to that variety. Don's plant (Herb. Brit., no. 110) is also referable to the var. *smithianus*, and probably came from Forfarshire, where the variety still grows, and where it was recently pointed out to us *in situ* by Mr and Mrs Corstorphine, of Arbroath. We have not been able to match this variety with any foreign specimens.

The plant, according to Professor Carr (*in litt.*), is now apparently extinct or nearly so in Nottinghamshire.

The var. *smithianus* seems to be intermediate between our *S. nutans* var. *vulgaris* and *S. nutans* var. *spathulifolia* Burnat *Fl. Alpes-Marit.* i, 213 (= *S. spathulifolia* Jordan in *Flora* 478 (1849)!); and it recalls *S. nutans* var. *livida* Otth in DC. *Prodr.* i, 378 (1824) (= *S. livida* Schleicher herb.!).

Rare; Kent, Carnarvonshire, Denbighshire, Nottinghamshire, Forfarshire, Kincardineshire.

*S. nutans* is a local British plant, occurring on sand-dunes (rarely), on calcareous grassland, on limestone cliffs, on sandstone cliffs (rarely), and on old walls; from the Channel Isles, Cornwall, and Kent northwards to Cumberland and Kincardineshire; Wales—Carnarvonshire, Denbighshire, and Flintshire; not recorded for Ireland; ascending to 310 m. in Derbyshire.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; northern Africa; Asia, eastwards to Japan; North America (not indigenous).

## [8. *SILENE ITALICA]

**Silene italica** Persoon *Syn.* i, 498 (1805); Syme *Eng. Bot.* ii, 65 (1864) partim[1]; Rouy et Foucaud *Fl. France* iii, 145 (1868); *Cucubalus italicus* L. *Syst. Nat.* ed. 10, 1030 (1759)!; *S. patens* Peete in *Eng. Bot. Suppl.* no. 2748 (1832).

Icones:—Sibthorp and Smith *Fl. Graeca* t. 429; Jacquin *Fl. Austr.* t. 97, as *Cucubalus italicus*; Peete in *Eng. Bot. Suppl.* t. 2748, as *S. patens*; Reichenbach *Icon. Crit.* iii, t. 292, fig. 465; *Icon.* vi, t. 295, fig. 5110.

Exsiccata:—Billot, 1828; Ehrhart, 35 (*Pl. Sal.*), as *Cucubalus italicus*; Huter (*Iter Ital.* iii), 132; Lange, 384; Noë, 17; Reichenbach, 2100.

*Shoot* more or less pubescent. *Stem* 2—8 dm. high. *Lower leaves* spathulate, ciliate. *Inflorescence* lax. *Peduncles* ascending. *Bracts* small, linear, densely ciliate, acute. *Flowers* erect, often dioecious, opening in the evening, fragrant, about 1·8 cm. in diameter; May to August. *Calyx* subcylindrical

[1] Syme's description refers in part to *S. nutans* var. *smithianus*.

broadest near the top, slightly umbilicate; segments short, ciliate, obtuse. *Petals* pale yellow, bifid, with two coronal scales. *Gynophore* about as long as the capsule.

By British botanists this has been greatly confused with the two varieties of *S. nutans*, the confusion sometimes appertaining to one variety and at other times to the other.

Not indigenous, and apparently now rare or extinct; Kent.

Southern France, central Europe, southern Europe; northern Africa; Asia Minor to Persia.

### 9. SILENE OTITES. Spanish Catchfly. Plate 78

*Otites taberni sive sesamoïdes parv. muscipula salamantica minor* How *Phyt.* 86 (1650); *Lychnis viscosa flore muscosa* C. Bauhin *Pinax* 206 (1671); Ray *Syn.* ed. 3, 340 (1724).

**Silene otites** Wibel *Prim. Fl. Wertham.* 241 (1799); Smith *Fl. Brit.* 469 (1800)!; Syme *Eng. Bot.* ii, 63 (1868); Rouy *Fl. France* iii, 139 (1896); *Cucubalus otites* L. *Sp. Pl.* 415 (1753).

Icones:—Smith *Eng. Bot.* t. 85, as *Cucubalus otites*; *Fl. Dan.* t. 518, as *C. otites*; Reichenbach *Icon.* vi, t. 289, fig. 5094.

*Camb. Brit. Fl.* iii. *Plate 78.* (*a*) Lower part of plant. (*b*) Middle part. (*c*) Flowering branches. (*d*) Staminate flowers. (*e*) Ovaries. (*f*) Mature capsules. Cambridgeshire (E. W. H.).

Exsiccata:—Billot, 114; Fries, xi, 40; Reichenbach, 2099; Wirtgen, vii, 265.

Perennial. *Root* vertical, very long. *Shoot* pubescent below, viscous above. *Stem* erect. *Lower leaves* narrowly spathulate, rather acute, up to 7—8 cm. long and 1—2 broad. *Stem-leaves* linear. *Inflorescence* subverticillate. *Pedicels* slender, longer than the calyx. *Flowers* 4—5 mm. in diameter, erect, hemi-dioecious; June to September. *Calyx* about 4 mm. long, tubular-obconical, slightly umbilicate, veins not anastomosing, segments rounded-obtuse, not contracted above when in fruit, glabrous. *Petals* pale yellow, linear oblong, entire, coronal scales absent. *Stamens* exserted. *Gynophore* short. *Stigmas* 2—5, exserted. *Capsule* slightly longer than the calyx, about 6—8 mm. long and 4—5 broad. *Seeds* subreniform, punctulate, flat on the two faces, with a deep dorsal groove.

Map 34. Distribution of *S. otites* in England

This is one of the characteristic plants of the non-acidic parts of the very light, sandy soils of western Norfolk, western Suffolk, and eastern Cambridgeshire. Other characteristic plants of this remarkable district are *Herniaria glabra* var. *vera*, *Scleranthus perennis*, *Silene conica*, *Holosteum umbellatum* (perhaps extinct), *Medicago falcata*, *M. falcata* × *sativa* (= × *M. sylvestris*), *Veronica verna*, *V. triphylla*, *V. spicata*, *Artemisia campestris*, *Carex ericetorum*, *Phleum boehmeri*, *Ornithogalum umbellatum*, and *Muscari racemosum*.

Locally abundant, on the light, sandy soils of western Suffolk, western Norfolk, and eastern Cambridgeshire, occurring only on grassland where the soil is not acidic.

Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; Asia.

## Genus 16. Cucubalus

**Cucubalus** [Tournefort *Inst.* 339, t. 176 (1700) emend.;] L. *Sp. Pl.* 414 (1753) et *Gen. Pl.* ed. 5, 192 (1754) emend.; Gaertner *Fruct.* i, 376, t. 57 (1788); Gray *Nat. Arr. Brit. Plants* ii, 645 (1821); *Gastro-Silene* Williams in *Journ. Bot.* xxxii, 13 (1894) as a subgenus.

Closely allied to *Silene*, differing chiefly in the strongly inflated and submembranous *calyx* with about 20 veins anastomosing below, and the *petals* imbricate in bud. *Styles* 3—5.

About 20 species; Europe; Asia; America.

#### Sections of *Cucubalus*

Section I. **Behen** (see below). *Fruit* dry.

[Section II. ***Eu-Cucubalus** (p. 84). *Fruit* succulent.]

#### Section I. *BEHEN*

**Behen** [Moench *Meth. Pl.* 709 (1794) partim, as a genus;] Grenier et Godron *Fl. France* i, 202 (1848); Rohrbach *Monogr.* 66 (1868) as a subgenus; Rouy et Foucaud *Fl. France* iii, 102 (1896).

For character, see above.

#### British species of *Behen*

1. **C. behen** (p. 82). *Inflorescence* many-flowered. *Bracts* membranous. *Seeds* with acute tubercles.
2. **C. maritimus** (p. 83). *Inflorescence* few-flowered. *Bracts* green. *Seeds* with flattened tubercles.

## 1. CUCUBALUS BEHEN. Bladder Campion. Plate 79

*Behen album* Gerard *Herball* 550 (1597)?; *B. album hispidum* Merrett *Pinax* 14 (1666) [= var. *pubescens*]; *Lychnis sylvestris quae ben album vulgo* C. Bauhin *Pinax* 205 (1671); Ray *Syn.* ed. 3, 337 (1724).

**Cucubalus behen** L. *Sp. Pl.* 414 (1753) excl. var. β; Hudson *Fl. Angl.* 163 (1762); Miller *Gard. Dict.* ed. 8, no. 4 (1768) incl. *C. latifolius* and *C. angustifolius*; Smith *Eng. Bot.* no. 164 (1794); *C. venosus* Gilibert *Fl. Lituan.* iv, 165 (1782) nomen abortivum; *Behen vulgaris* Moench *Meth. Pl.* 709 (1794); *C. inflatus* Salisbury *Prodr.* 302 (1796) nomen abortivum; *Silene cucubalus* Wibel *Prim. Fl. Wertham.* 241 (1799); *S. inflata* Smith *Fl. Brit.* 467 (1800)!; Syme *Eng. Bot.* ii, 56 (1864); *S. venosa* Ascherson *Fl. Prov. Brandenb.* 86 (1864); *S. cucubalus* race *vesicaria* Rouy et Foucaud *Fl. France* iii, 103 (1896); *S. latifolia* Rendle and Britten in *Journ. Bot.* xlv, 100 (1907) non Poiret.

Icones :—Smith *Eng. Bot.* t. 164, as *Cucubalus behen*; *Fl. Dan.* t. 914, as *C. behen*; Reichenbach *Icon.* t. 299 et t. 300, fig. 5120, as *S. inflata.*

*Camb. Brit. Fl.* iii. *Plate 79.* (*a*) Lower part of shoot. (*b*) Flowering shoot. (*c*) Capsules. Isle of Wight (E. W. H.). (*d*) Flowering shoot. (*e*) Lower leaves. Cambridgeshire (E. W. H.). *d* and *e* = var. *pubescens.*

Exsiccata :—Billot, 1620, as *S. inflata*; Daveau (*Herb. Lusit.*), as *S. inflata*; Dickson xix, 3; Ehrhart (*Pl. Off.*), 454; Huter, iii, 497, as *S. inflata*; *Herb. Fl. Ingric.* i, 44, as *S. inflata.*

Perennial. *Shoot* glabrous or pubescent, subglaucous. *Branches* terete, ascending or straggling. *Leaves* sessile, lower ones oblong or oblong-obovate, upper ones narrowly ovate, subobtuse to acute, up to about 7·5 cm. long and 3·3 broad. *Inflorescence* dichasial, main lateral branches usually with 3—11 flowers. *Pedicels* 2—3 times as long as the calyx. *Bracts* membranous. *Flowers* sometimes more or less dioecious and zygomorphic, about 1·5 to 2·0 cm. in diameter, appearing about a month later than those of *C. maritimus*; early June to September. *Calyx* large, broadly elliptical, inflated, rather membranous, reticulate, up to about 1·5 cm. long and 1 broad; tube large; teeth small, broadly triangular, submucronate, about 2—3 mm. long and rather broader at the base. *Petals* white, pale yellowish, or rarely purplish, comparatively small though variable in size and shape, deeply bifid, claw winged at the sides, coronal scales absent. *Stamens* exserted. *Gynophore* stout, rather shorter than the ovary. *Ovary* green, about 4 mm. long. *Stigmas* nearly 2·0 cm. long. *Capsule* inflated; teeth small. *Seeds* rather more than 1 mm. in diameter, with acute concentric tubercles; aril black, well developed.

British forms vary a great deal in hairiness, in the width of the leaves, and in the size and shape of the petals. Most or all of the varieties of *C. maritimus* (see p. 84) seem to have their analogues under *C. behen.* The form named *Silene brachiata* by Jordan in Boreau *Fl. Centr. France* éd. 3, ii, 94 (1857) has been recorded for Berkshire by Mr Druce (in *Journ. Bot.* xliii, 17 (1905)).

Dr F. Buchanan White (in *Journ. Bot.* viii, 323 (1870)) examined 15 flowers of this species: 5 were monoclinous, 6 pistillate, 3 staminate, and 1 with a tendency towards the last condition. In every staminate flower, and in those alone, the anthers were filled with spores of *Ustilago.*

(*a*) **C. behen** var. **vulgaris** comb. nov.; *Silene inflata* var. *vulgaris* [Otth. ms. ex] DC. *Prodr.* i, 368 (1824); *S. inflata* var. *genuina* Grenier et Godron *Fl. France* i, 202 (1848); Syme *Eng. Bot.* ii, 56 (1864); *S. cucubalus* race *vesicaria* var. *gennina* Rouy et Foucaud *Fl. France* iii, 104 (1896) incl. var. *latifolia.*

*Shoot* less glaucous than in var. *pubescens*, glabrous. *Seeds* black.

This is the common form of the species in the British Isles.

(*b*) **C. behen** var. **pubescens** comb. nov.; *Silene inflata* var. *pubescens* DC. *Fl. Franç.* iv, 747 (1805); *Cucubalus inflatus* var. *hirsutus* Gray *Nat. Arr. Br. Plants* ii, 645 (1821); *S. puberula* Jordan ex Boreau *Fl. France* 94 (1857); *S. inflata* var. *puberula* Syme *Eng. Bot.* ii, 56 (1864); *S. cucubalus* race *vesicaria* var. *pubescens* Rouy et Foucaud *Fl. France* iii, 105 (1896).

Exsiccata :—Billot, 4003.

*Shoot* more glaucous than in var. *vulgaris*, very hairy below the uppermost internode of the stem. *Seeds* grey.

Not uncommon on strongly calcareous soils where it occurs mixed with var. *vulgaris* and with intermediates: the latter are perhaps hybrids of the two varieties. Recorded for many counties in the south of England, northwards to Cambridgeshire and Flintshire.

(*c*) ***C. behen** var. **angustifolius** comb. nov.; *C. angustifolius* Miller *Gard. Dict.* ed. 8, no. 3 (1768); *C. maritimus* Lamarck *l. c.*, partim; *Silene inflata* var. *angustifolia* DC. *Fl. Franç.* iv, 747 (1805); *S. angustifolia* Gussone *Fl. Sic. Prodr.* i, 500 (1827).

Icones :—Reichenbach *Icon.* vi, t. 300, fig. 5120, as *Silene inflata* var. *angustifolia.*

*Laminae* longer and narrower than in var. *vulgaris* and var. *pubescens.* *Flowers* smaller.

There is a specimen of this variety in Herb. Univ. Cantab. collected by Major A. H. Wolley-Dod, "Woolwich Arsenal," Kent, in July, 1894: possibly it occurred adventitiously.

Common in cultivated land, roadsides, and in waste places generally; throughout the British Isles except the extreme north where it is absent and in hilly districts where it is rare; ascending to 348 m. in Perthshire.

Iceland, Scandinavia (to 70° N.), Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 2600 m. in Switzerland), Russia, southern Europe; Asia; North America (not indigenous).

***Cucubalus behen* × *maritimus*** comb. nov.; *Silene inflata* × *maritima* Wolley-Dod in *Bot. Exch. Club Brit. Is. Rep. for 1901*, 6 (1902)!

Intermediate between the putative parents in the breadth of the leaves and the number of flowers in the inflorescence. "Capsules barren" (W.-D., *loc. cit.*).

Kent, Somerset, Gloucestershire, and perhaps elsewhere, growing with the alleged parents.

## 2. CUCUBALUS MARITIMUS. Sea Campion. Plate 80

*Lychnis marina anglicana* Gerard *Herball* 382 (1597); *L. maritima repens* C. Bauhin *Pinax* 205 (1671); Ray *Syn.* ed. 3, 337 (1724); *L. perennis angustifolia marina anglica procumbens* Morison *Pl. Hist.* ii, 535, t. 20, sect. v, fig. 2 (1680).

**Cucubalus maritimus** [Lamarck *Encycl. Meth., Bot.* ii, 220 (1786) emend.;] Gray *Nat. Arr. Brit. Plants* ii, 645 (1821); *C. behen* var. *β* L. *Sp. Pl.* 414 (1753); *Silene amoena* Hudson *Fl. Angl.* 164 (1762) non L., excl. diagn.[1]; *Silene maritima* Withering *Bot. Arr. Brit. Pl.* ed. 3, ii, 414 (1796); Smith *Fl. Brit.* 468 (1800)!; Syme *Eng. Bot.* ii, 57 (1864); *C. littoralis* Persoon *Syn.* i, 496 (1805); *S. cucubalus* race *maritima* Rouy et Foucaud *Fl. France* ii, 107 (1896).

Icones :—Smith *Eng. Fl.* t. 957, as *Silene maritima*; *Fl. Dan.* t. 857, as *Cucubalus behen* var. *repens*; Reichenbach *Icon.* t. 299, fig. 5119, as *Silene maritima.*

*Camb. Brit. Fl.* iii. *Plate 80.* (*a*) Barren branch. (*b*) Flowering branch. Devonshire (E. W. H.). (*c*) Flowering branches. (*d*) Persistent calyx and ripening fruit. (*e*) Petal. (*f*) Ovary. Hampshire (E. W. H.). (*g*) Flowering branch. Mulroy Island (E. W. H.). (*h*) Persistent calyx. (*i*) Capsule. Jersey (E. W. H.).

Exsiccata :—Billot, 1433, as *S. maritima*; Fries, iv, 52; Lange, 367, as *S. maritima*; Schultz, xi, 1023, as *S. maritima*; Welwitsch (*Fl. Lusit.*), 841, as *S. maritima.*

*Root* stout, penetrating a long way into the soil. *Shoot* more compact, less straggling, and rather more glaucous than in *C. behen.* *Branches* shorter. *Laminae* smaller and narrower, more attenuate at the base, rather thicker, about 2·0 cm. long and 0·5 broad. *Inflorescence* usually with only 1—3 flowers. *Bracts* green. *Flowers* sometimes more or less dioecious and more or less zygomorphic, up to 2·5 cm. in diameter; late April to August, appearing about 3—4 weeks earlier than in *C. behen.* *Coronal scales* present. *Gynophore* green, about 5 mm. long and 3 broad. *Filaments* white, fixed on the disc at the top of the gynophore. *Anthers* violet before dehiscence. *Ovary* violet-brown, a little smaller than the gynophore. *Capsule* less ventricose than in *C. behen* and with larger teeth. *Seeds* with oblong flattened concentric tubercles, rather smaller than in *C. behen*, about 1 mm. in diameter; aril black, rather rudimentary.

"The technical distinctions between this plant and the preceding [*C. behen*] are very slight, yet seeming constant, and under varied conditions of garden culture during several successive descents" (H. C. Watson *Top. Bot.* ed. 2, p. 65). The characters, however, of the bracts, inflorescence, and the seed are easily sufficient for the separation of the two species; and the difference in their times of flowering is very marked.

This species is interesting as it occurs on sand-dunes and in inland localities, usually on mountains, but is absent from the intervening localities. Cf. also *Sagina maritima*, *Armeria maritima*, and *Plantago maritima.*

[1] *S. amoena* L. is a Siberian plant; and the specimen in the Linnaean herbarium bears no resemblance to the sea campion of western Europe. Hudson's reference of the latter plant to *S. amoena* L. is one of his numerous misidentifications, most of which were corrected by Smith. The errors are found in all British floras between the time of Hudson and that of Smith. The following are a few examples of the mistakes in question:—*Aquilegia alpina* Hudson, *Cucubalus viscosus* Hudson, *Dianthus glaucus* Hudson (cf. p. 91), *Erica multiflora* Hudson, *Melica nutans* Hudson, *Silene conoïdea* Hudson, many species of *Carex*, many ferns. In each of such misidentifications, Hudson quotes the diagnosis of Linnaeus, which was not originally intended to apply to the plant which Hudson had in mind. Hudson goes on to add British pre-Linnaean synonyms and the British distribution. Hence in synonymy it seems as if we must exclude the diagnosis when we cite Hudson's name for the British plant. It was natural that Hudson, the first post-Linnaean British botanist to publish a Flora of this country, should make such mistakes, especially as he seems to have often been misled by the dissertations of Linnaeus and his pupils.

Dr F. Buchanan White (see *Journ. Bot.* viii, 323, 1870) found that of 72 plants of this species which he examined, 11 had the stamens abortive, 10 had the styles abortive, whilst 11 showed a tendency to this condition, 1 had both staminate and pistillate flowers, and the remaining plants were monoclinous or hermaphrodite. The monoclinous plants may be distinguished at once by their larger flowers, and have the stamens as long as the stigmas. In the staminate flowers, the stamens were 4—6 times as long as the rudimentary stigmas; and in the pistillate flowers, the stigmas were 2—4 times as long as the stamens.

A double-flowered form was described by Dr E. J. Salisbury (in *New Phyt.* xi, pp. 7—12 (1912)). In this, the essential organs of the flower have become petaloid: the flowers are about 3·0—4·0 cm. in diameter; and the petals are slightly cream-coloured. Several other forms were at the same time described by Salisbury; and these we set out below. Druce (cf. *Journ. Bot.* 30 (1906); 56 (1910)) describes a *Silene maritima* var. *parvifolia* as a "large diffuse prostrate plant...the leaves very small ($\frac{1}{4}-\frac{1}{3}$ in.), ...the solitary or subsolitary flowers of the normal size." Mansel-Pleydell (*Fl. Dorset.* 71 (1874)) has also mentioned a form with a yellow calyx (see also *Bot. Exch. Club Brit. Is. Rep. for 1912*, p. 235).

Dr Salisbury informs me (*in litt.*) that as a result of cultural experiments, he finds that the sex of the following varieties is not affected by good or poor soil.

(*a*) **C. maritimus** var. **incumbens** comb. nov.; *Silene maritima* forma *incumbens* Salisbury *op. cit.* p. 10.

*Flowers* monoclinous, 2·0—2·5 cm. in diameter. *Petals* contiguous, slightly overlapping, with lobes of the limb either touching or overlapping, coronal scales small or absent. *Stigmas* 3—5.

Very common.

(*b*) **C. maritimus** var. **divergens** comb. nov.; *Silene maritima* forma *divergens* Salisbury *op. cit.* p. 10.

*Flowers* monoclinous, 2·0—2·5 cm. in diameter. *Petals* discrete or slightly overlapping, lobes diverging, coronal scales usually present.

Common.

(*c*) **C. maritimus** var. **involutus** comb. nov.; *Silene maritima* forma *involuta* Salisbury *op. cit.* p. 10.

*Flowers* monoclinous, 2·0—2·5 cm. in diameter. *Petals* with divergent lobes, edges of the lobes involute from the apex to about half-way along the lobe.

Rather rare.

(*d*) **C. maritimus** var. **lobatus** comb. nov.; *Silene maritima* forma *lobata* Salisbury *op. cit.* p. 10.

*Flowers* monoclinous, about 3·0 cm. in diameter. *Petals* not contiguous, with lobes diverging towards the apex, each lobe with 2 lateral narrow lobelets arising asymmetrically near the base of its outer margin, lobelets up to about 5 mm. long, coronal scales prominent. *Stigmas* 3—5.

Rather rare.

(*e*) **C. maritimus** var. **lobato-foeminus** comb. nov.; *S. maritima* forma *lobato-foemina* Salisbury *op. cit.* p. 11.

*Flowers* hemi-diclinous, smaller than in var. *lobatus*. *Stamens* reduced to staminodes.

Very rare.

(*f*) **C. maritimus** var. **foeminus** comb. nov.; *Silene maritima* forma *foemina* Salisbury *op. cit.* p. 11.

*Flowers* hemi-diclinous, small (1·0—1·5 cm. in diameter). *Petals* usually slightly purplish in colour, widely separate from each other, lobes divergent, coronal scales present or not. *Stamens* reduced to staminodes, filaments long, anthers abortive, scarcely reaching to the base of the ovary.

Rather rare.

*C. maritimus* is locally abundant on sand-dunes, shingle-banks, and rocks near the sea; rather rare in inland hilly and mountainous localities (and then preferring soil with a high mineral content), as on gravel near old mines, on the banks of streams, and on wet mountain cliffs; ascending to 940 m. on Ben Nevis; in nearly all the maritime counties of the British Isles, and in most hilly and mountainous districts; absent from the centre of England and the centre of Ireland.

Iceland, Scandinavia, Denmark, Belgium, northern and western France, northern Spain, Portugal.

*C. behen*×*maritimus* (p. 83).

## Section II. **EU-CUCUBALUS*

**Eu-Cucubalus** nobis; *Cucubalus* [Tournefort *l.c.*, sens. str.;] Gaertner *l.c.*, sens. stricto.

For characters, see p. 81. Only British species:—**C. baccifer.*

## [3. *CUCUBALUS BACCIFER. **Plate 81**]

*C. plinii* Dillenius in Ray *Syn.* ed. 3, 267 (1724).

**Cucubalus baccifer** L. *Sp. Pl.* 414 (1753)!; Smith *Fl. Brit.* 464 (1800)!; Gray *Nat. Arr. Brit. Plants* ii, 645 (1821); Syme *Eng. Bot.* ii, 54 (1864); Rouy et Foucaud *Fl. France* iii, 101 (1896); *Silene baccifer* Withering *Bot. Arr.* ed. 2, 452 (1787).

Icones :—Smith *Eng. Bot.* t. 1577; Reichenbach *Icon.* vi, t. 302.

*Camb. Brit. Fl.* iii. *Plate 81.* (*a*) Flowering shoot. (*b*) Flowers. (*c*) Ovary. Hort. (E. M. H.).

Exsiccata :—Billot, 1432; Bourgeau (*Pl. Lyc.*), 38; Dickson, iv, 9 (hort.); Gandoger (*Fl. Gall. Exsicc.*), 116, as *C. sphaericus*; 999, as *C. lugdunensis*; Lange, 365; Wirtgen, xvi, 886.

*Shoot* pubescent. *Branches* 4—6 dm., diffuse. *Petioles* short or almost absent. *Laminae* oval, acute, up to about 4 cm. long and 2 broad. *Inflorescence* 3—4-flowered, dichasial above. *Flowers* July and August. *Calyx* green or purplish brown, with 5 sepals. *Petals* tinged with green or yellow, deeply bifid. *Styles* 3. *Fruit* globular, about 8—10 mm. in diameter, succulent, ultimately black and dry. *Seeds* black, shining, punctate.

Very rare and not indigenous; on the banks of a ditch in the Isle of Dogs, Middlesex, "but almost certainly introduced" (Syme *op. cit.* 54), and now extinct there; adventitious elsewhere, as in Norfolk.

Germany, Holland, France, central Europe, Russia, southern Europe; Asia.

## Tribe VII. *DIANTHEAE*

**Diantheae** Reichenbach *Handb. Natürl. Pflanzen.* 298 (1837); A. Braun in *Flora* xxvi, 377 (1843); Pax *op. cit.* 69 et 74 (1889); Rouy et Foucaud *Fl. France* iii, 150 (1896).

For characters, see page 14.

BRITISH GENERA OF *Diantheae*

Genus 17. ***Vaccaria** (see below). *Epicalyx* absent. *Calyx* 5-angular, not umbilicate. *Petals* with claw and limb gradually passing into each other; coronal scales absent.

Genus 18. †**Saponaria** (p. 86). *Epicalyx* absent. *Calyx* terete, umbilicate. *Petals* with limb and claw well defined; coronal scales absent.

Genus 19. **Tunica** (p. 86). *Epicalyx* present, loose-fitting, soon becoming scarious, covering all or most of the calyx. *Petals* with limb and claw gradually passing into each other; coronal scales absent.

Genus 20. **Dianthus** (p. 88). *Epicalyx* present, tight-fitting, herbaceous during the flowering period, covering the lower half or less than half of the calyx. *Petals* with limb and claw well-defined; coronal scales present.

## Genus 17. *Vaccaria

**Vaccaria** Moench *Meth. Pl.* 63 (1794); Al. Braun in *Flora* xxvi, 381 (1843); Willkomm et Lange *Prodr. Fl. Hisp.* iii, 672 (1878); Pax *op. cit.* 75 et 76 (1889); Rouy et Foucaud *Fl. France* iii, 155 (1896).

*Epicalyx* absent. *Calyx* oval-pyramidal, 5-angled, many-veined, not umbilicate. *Gynophore* very short. *Petals* with claw and limb passing gradually into each other, claw winged, coronal scales absent. *Stamens* 5 + 5. *Capsule* opening by 4 short teeth, persistently biseptate towards the base. *Embryo* horse-shoe-shaped. *Seeds* reniform to subglobose.

The genus *Vaccaria* is often cited as of Medicus *Phil. Bot.* i, 96 (1789); but no such genus is there established.

3 species; Europe; western Asia.

### [1. *VACCARIA PARVIFLORA. **Plate 82**]

*Vaccaria* Gerard *Herball* 395 (1597).

**Vaccaria parviflora** Moench *Meth. Pl.* 63 (1794); Rouy et Foucaud *Fl. France* iii, 155 (1896); *Saponaria vaccaria* L. *Sp. Pl.* 409 (1753); Miller *Gard. Dict.* ed. 8, no. 3 (1768); *V. pyramidata* Medicus *Phil. Bot.* i, 96 (1789) descr. gen. nulla; *S. segetalis* Necker *Delic. Gallo-Belg.* 194 (1768) nomen abortivum; *Lychnis vaccaria* Scopoli *Fl. Carn.* ed. 2, ii, 303 (1772); *S. rubra* Lamarck *Fl. Fr.* ii, 541 (1778) nomen abortivum; *Gypsophila vaccaria* Sibthorp et Smith *Fl. Graec. Prodr.* i, 279 (1806).

Icones :—Reichenbach *Icon.* vi, t. 245.

*Camb. Brit. Fl.* iii. *Plate 82.* (*a*) Flowering branch. (*b*) Petal. (*c*) Ovary. Hort., origin Nottinghamshire.

Exsiccata :—Billot, 728, as *Gypsophila vaccaria*; Reichenbach, 2499, as *V. pyramidata*; Thielens et Devos, i, 39, as *S. vaccaria.*

Annual. *Shoot* glabrous, somewhat glaucous. *Stem* erect, 3—6 dm., leafy. *Leaves*—lower ones oblong, attenuate at the base; upper ones sessile, lanceolate, subconnate, cordate, acuminate. *Pedicels* long. *Flowers* about 1·5 cm. in diameter; June and July. *Calyx* not umbilicate, pyramidal. *Petals* rose-pink; limb short. *Capsule* ovoid, shorter than the calyx. *Seeds* black, large.

Not indigenous; rare in cultivated land and waste places, usually adventitious; northwards to Carnarvonshire.

Germany, Belgium, France, central Europe, Russia, southern Europe; northern Africa; Asia; Australasia. Adventitious in western Europe (including Sweden, Denmark, and Holland) and in North America.

## Genus 18. †Saponaria

**Saponaria** L. [*Gen. Pl.* 130 (1737);] *Sp. Pl.* 408 (1753) et *Gen. Pl.* ed. 5, 191 (1754); Al. Braun in *Flora* xxvi, 377 (1843); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 *b*, 75 et 78 (1889); Rouy et Foucaud *Fl. France* iii, 150 (1896).

Herbs. *Epicalyx* absent. *Calyx* cylindrical, terete, with about 12—15 veins, umbilicate. *Petals* with claw and limb well-marked, limb spreading, coronal scales absent. *Stamens* 5 + 5. *Capsule* opening by 4 teeth, persistently biseptate towards the base. *Embryo* almost annular, hilum lateral. *Seeds* reniform.

About 20 species; central, southern, and eastern Europe; northern Africa; Asia.

### 1. †SAPONARIA OFFICINALIS. Soapwort. Plate 83

*Saponaria* Gerard *Herball* 360 (1597); *Lychnis saponaria dicta* Ray *Syn.* ed. 3, 339 (1724) incl. *L. saponaria dicta folio convoluto.*

1. **Saponaria officinalis** L. *Sp. Pl.* 408 (1753)!; Smith *Fl. Brit.* 459 (1800)!; Syme *Eng. Bot.* ii, 53 (1864); Rouy et Foucaud *Fl. France* iii, 151 (1896).

Icones:—Smith *Eng. Bot.* t. 1060; Curtis *Fl. Lond.* i, 82; *Fl. Dan.* t. 543; Reichenbach *Icon.* vi, t. 245, fig. 4995.

*Camb. Brit. Fl.* iii. *Plate 83.* (*a*) Flowering shoot. (*b*) Petal. Isle of Wight (E. W. H.).

Exsiccata:—Billot, 1829; Don, 183; Todaro, 266.

Perennial. *Rhizome* rather thick, creeping. *Shoot* glabrous, rarely more or less hairy. *Flowering stems* erect, about 2 dm. high. *Leaves* somewhat soapy to the touch. *Flowers* often double, very rarely gamopetalous, odorous, about 3 cm. in diameter; August and September. *Gynophore* short, thick. *Calyx* umbilicate at the base. *Petals* pale lilac to white, with claws longer than the calyx, emarginate, often double, sometimes joined.

Possibly not indigenous anywhere in the British Islands. As a plant of suspicious garden origin, it occurs (frequently with double flowers) in nearly all the English counties, and several in Wales, Scotland, and Ireland. Chiefly in hedgebanks; but it also occurs on or near sand-dunes, as in Somerset, Norfolk, and Lancashire. It seems to prefer light, sandy soils.

Scandinavia (not indigenous), Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; Asia; North America (not indigenous).

## Genus 19. Tunica

**Tunica** [Haller *Enum. Stirp. Helv.* i, 381 (1742) partim; Adanson *Fam. Pl.* ii, 255 (1763);] Scopoli *Fl. Carn.* ed. 2, ii, 298 (1772) pro min. parte; Bentham and Hooker *Gen. Pl.* i, 145 (1862); Pax in Engler und Prantl *Pflanzenfam.* iii, pt. 1 *b*, 74 et 76 (1889).

Herbs. *Epicalyx* not closely appressed to the calyx, soon becoming scarious, almost or completely enveloping the calyx. *Calyx* turbinate, 5-angled, angles somewhat scarious, with 5—15 veins, 5-toothed. *Gynophore* short. *Petals* with claw and limb gradually passing into each other, coronal scales absent. *Stamens* 5 + 5. *Capsule* without persistent septa. *Embryo* straight, hilum facial.

About 20 species; Europe, especially southern Europe.

#### Sections of *Tunica*

Section I. ***Eu-Tunica** (p. 87). Perennial. *Petals* with the claw gradually widening to the limb, not convergent at the throat. *Epicalyx* membranous strongly 1-nerved, not completely enveloping the calyx.

Section II. **Kohlrauschia** (p. 87). Monocarpic. *Petals* with the claw sharply marked off by the sudden contraction of the limb, convergent at the throat. *Epicalyx* membranous, completely enveloping the calyx.

## Section I. **EU-TUNICA*

**Eu-Tunica** Boissier *Fl. Orient.* i, 518 (1867); Rouy et Foucaud *Fl. France* iii, 158 (1896).

For characters, see p. 86. Only British species: * *T. saxifraga.*

### 1. *TUNICA SAXIFRAGA. Plate 84

**Tunica saxifraga** Scopoli *Fl. Carn.* ed. 2, i, 300 (1772); Al. Braun in *Flora* xxvi, 384 (1843); Rouy *Fl. France* iii, 158 (1896).

Icones :—Reichenbach *Icon.* vi, t. 247, fig. 5006 b.

*Camb. Brit. Fl.* iii. *Plate 84.* (*a*) Flowering branch. (*b*) Petals. (*c*) Ovary. Pembrokeshire (S. H. B.).

Exsiccata :—Mabille (*Herb. Cors.*), 216, as *T. bicolor*; Reichenbach, 393, as *Gypsophila rigida*; A. Schultz (*Fl. Istr. Exsicc.*), 16; Todaro, 231, as *G. permixta*; Welwitsch (*Fl. Lusit.*), 851, as *G. saxifraga.*

Perennial. *Shoot* usually glabrous. *Branches* numerous, diffuse. *Leaves* sessile, subconnate, narrow, linear, scabrid, acute. *Inflorescence* with few flowers. *Flowers* about 1·3—1·5 cm. in diameter; July and August. *Epicalyx* deciduous, not completely enveloping the calyx, deeply divided; segments 4, 2 longer than the others, imbricate at the base, green in the centre, margins broad and white, acute. *Calyx* 5-toothed. *Petals* rose-coloured, emarginate, limb gradually narrowing into the claw. *Stigmas* about three times as long as the ovary. *Seeds* small, dark brown, about twice as long as broad.

At the foot of a land-cliff on ground adjoining a public path near the railway station, Tenby, Pembrokeshire (sent to us by Mr G. Ginger, of Manchester, in 1908). Doubtless it was a garden escape originally, and subsequently self-sown.

France (central and south-eastern), Germany (southern), Switzerland, Austria-Hungary, Portugal, Spain, Italy, south-eastern Europe; south-western Asia to Persia; North America (not indigenous).

## Section II. *KOHLRAUSCHIA*

**Kohlrauschia** [Kunth *Fl. Berol.* i, 108 (1838) as a genus;] Boissier *Fl. Orient.* i, 516 (1867); Rouy et Foucaud *Fl. France* iii, 159 (1896).

For characters, see page 86. Only British species :—*T. prolifer.*

### 2. TUNICA PROLIFER. Plate 85

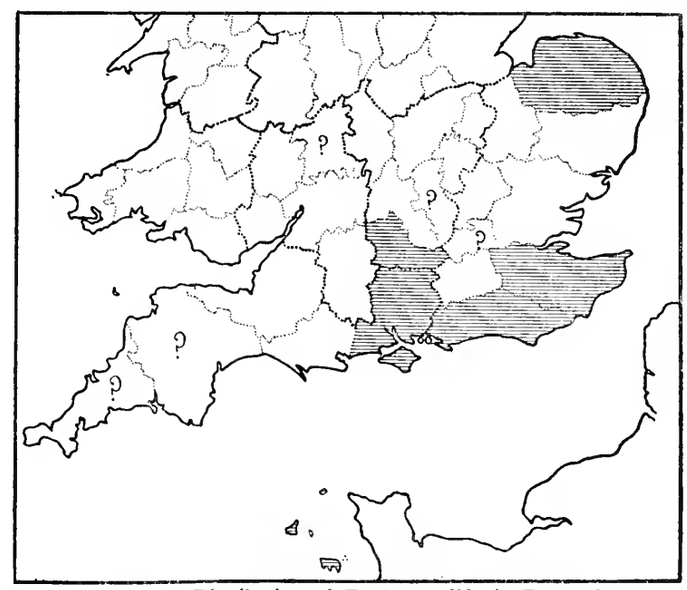
*Armeria prolifera* Johnson in Gerard's *Herball* ed. 2, 599 (1636); *Caryophyllus sylvestris prolifer* Dillenius in Ray *Syn.* ed. 3, 337 (1724).

**Tunica prolifer** Scopoli *Fl. Carn.* ed. 2, i, 299 (1772); Rouy *Fl. France* iii, 159 (1896); *Dianthus prolifer* L. *Sp. Pl.* 410 (1753)!; Smith *Fl. Brit.* 460 (1800)!; Syme *Eng. Bot.* ii, 51 (1864); *Kohlrauschia prolifer* Kunth *Fl. Berol.* i, 109 (1838).

Icones :—Smith *Eng. Bot.* t. 956, as *Dianthus prolifer*; *Fl. Dan.* t. 221, as *Dianthus prolifer*; Reichenbach *Icon.* vi, t. 247, fig. 5009, as *Kohlrauschia prolifer.*

*Camb. Brit. Fl.* iii. *Plate 85.* (*a*) Lower leaves. (*b*) Flowering shoots. (*c*) Middle stem-leaves. (*d*) Petals. (*e*) Withered flower. (*f*) Capsule. Cambridge Botanic Garden (R. I. L.).

Exsiccata :—Billot, 2027, 2027 bis, 2027 ter, as *Dianthus prolifer*; Bourgeau (*Pl. d'Esp.*), 963, as *Tunica prolifera*; Fries (Ringius), ii, 24, as *D. prolifer*; Welwitsch (*Iter. Lusit.*), 222, as *D. prolifer.*



Map 35. Distribution of *Tunica prolifer* in England

Annual. *Shoot* glabrous. *Flowering branches* erect, elongate. *Leaves* sessile, linear, up to 5—6 cm. long, somewhat scabrous at the margin. *Inflorescence* with about 1—12 flowers. *Peduncles*

elongate. *Pedicels* very short. *Flowers* up to about 8 mm. in diameter; June to August. *Epicalyx* with 4—6 segments, soon becoming scarious; segments oval, obtuse, nearly as long as the calyx. *Calyx* glabrous, each sepal indistinctly 3-nerved, teeth short. *Petals* rose-pink, a little emarginate or crenulate, limb alternating into the claw, claw scarcely longer than the calyx. *Capsule* elliptical, included within the calyx. *Seeds* black, punctulate.

On dry ground, this sometimes occurs as a dwarf-form *T. prolifer* forma *gracilis* nobis; (= *Dianthus diminutus* L. *Sp. Pl.* ed. 2, 587 (1762); = *D. prolifer* var. *diminutus* DC. *Fl. Franç.* éd. 3, iv, 741 (1805). This *forma* has been recorded for Germany, France, Switzerland, Austria (Transylvania), and Sicily.

Dry sandy or gravelly ground; Channel Isles (common in parts of Jersey), Isle of Wight (perhaps extinct), Hampshire, Sussex, Kent, Berkshire, and Norfolk; some other records require confirmation. Not in Wales, Scotland, or Ireland.

Southern Sweden, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; northern Africa; south-western Asia; North America (not indigenous).

## Genus 20. Dianthus

**Dianthus** L. [*Gen. Pl.* 130 (1737);] *Sp. Pl.* 409 (1753) et *Gen. Pl.* ed. 5, 191 (1754); Al. Braun in *Flora* xxvi, 385 (1843); Williams in *Journ. Bot.* xxiii, 340 (1885); Rouy et Foucaud *Fl. France* iii, 161 (1896); [*Caryophyllus* Tournefort *Inst.* 329, t. 174 (1700)].

Undershrubs (rarely), or herbs, usually perennial, often caespitose. *Leaves* sessile, long and narrow, more or less connate, entire or ciliolate. *Bracts* leaf-like. *Bracteoles* involucral, forming a tight-fitting epicalyx of 2—16 (usually 4) segments, segments herbaceous during the flowering period. *Calyx* cylindrical, terete, rarely obtusely 5-angular, tube long, teeth short; veins usually not conspicuous, about 15, usually reddish-purple or whitish. *Petals* with claw and limb well-differentiated; claw longer than the limb; limb spreading, outer margin entire or toothed or laciniate; coronal scales present. *Gynophore* distinct, with an annular ridge at the top bearing petals, stamens, nectaries, and ovary. *Stamens* 5 + 5. *Stigmas* 2 (very rarely 3). *Capsule* ovoid or cylindrical, persistent septa absent. *Embryo* straight, funicle curved. *Seeds* orbicular, apiculate, convex above, concave or flat underneath, involute at the margin, punctulate, black.

About 250 species; Europe (chiefly central and southern); Asia; Africa.

### British Species of *Dianthus*

1. **D. armeria** (p. 89). *Shoot* pubescent. *Laminae* ciliate at the margin. *Inflorescence* with 3—8 flowers. *Flowers* about 1·5 cm. in diameter. *Epicalyx* of 2 lanceolate segments, as long as the calyx, not closely appressed to the calyx. *Calyx* strongly veined. *Petals* not contiguous, irregularly denticulate.

2. **D. deltoïdes** (p. 89). *Shoot* more or less glaucous, somewhat pubescent. *Flowers* about 1·7—2·0 cm. in diameter. *Epicalyx* with 2—4 segments; segments ovate-acuminate, half as long as the calyx-tube. *Calyx* furrowed. *Petals* not contiguous, dentate.

3. **D. caesius** (p. 91). *Shoot* very glaucous. *Laminae* with scabriusculous margins. *Inflorescence* with 1—3 flowers. *Flowers* about 3 cm. in diameter. *Epicalyx* with 4 segments, exterior ones obovate, interior ones subrotund, all mucronate, a quarter or a fifth as long as the calyx. *Calyx* faintly veined. *Petals* contiguous, dentate or a little laciniate.

4. †**D. gallicus** (p. 92). *Shoot* glaucous. *Inflorescence* with 1—3 flowers. *Flowers* about 3 cm. in diameter. *Epicalyx* of 4 segments, rather loose; segments very unequal, obovate and mucronate. *Calyx* rather strongly veined. *Petals* almost contiguous, dentate or rather laciniate.

5. ***D. plumarius** (p. 92). Perennial. *Shoot* glaucous. *Inflorescence* with 1—3 flowers. *Epicalyx* of 4 segments; segments cuspidate, a quarter as long as the calyx. *Flowers* about 3 cm. in diameter. *Calyx* strongly veined. *Petals* barbulate, almost contiguous.

6. ***D. caryophyllus** (p. 92). *Shoot* glaucous. *Inflorescence* with 4—6 flowers. *Flowers* about 3·0—3·5 cm. in diameter. *Epicalyx* with 4 segments; segments obovate-mucronate, a quarter or a fifth as long as the calyx. *Calyx* faintly veined. *Petals* contiguous, dentate.

## 1. DIANTHUS ARMERIA. Deptford Pink. Plate 86

*Caryophyllus pratensis* Johnson in Gerard *Herb.* ed. 2, t. 11, 594 (1633); *Armeria sylvestris altera caliculo foliolis fastigiato cincto* etc. Johnson *Kent* 5 (1629); *Caryophyllus latifolius barbatus minor annuus flore minore* Ray *Syn.* ed. 3, 337 (1724).

**Dianthus armeria** L. *Sp. Pl.* 410 (1753)!; Smith *Eng. Bot.* no. 317 (1796); *Fl. Brit.* 460 (1800)!; Syme *Eng. Bot.* ii, 45 (1864); Rouy et Foucaud *Fl. France* iii, 168 (1896).

Icones:—Smith *Eng. Bot.* t. 317; *Fl. Dan.* t. 230; Reichenbach *Icon.* t. 249, fig. 5011.

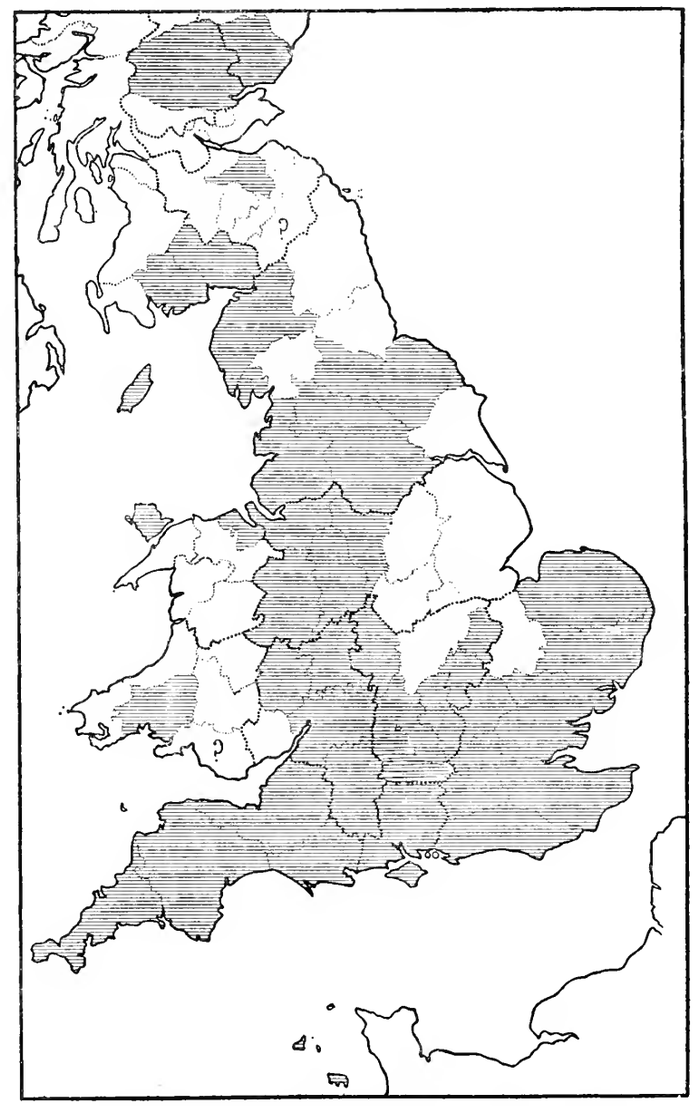
*Camb. Brit. Fl.* iii. *Plate 86.* (*a*) Flowering branch. (*b*) Epicalyx. (*c*) Petals (enlarged). (*d*) Petals and stamens. Huntingdonshire (E. W. H.).

Exsiccata:—Billot, 1618; Dickson, xvi, 3; Gandoger (*Fl. Seq. Exsicc.*), 417.

Annual or biennial. *Shoot* pubescent, dark green. *Stem* terete, simple below. *Laminae* linear-lanceolate, connate, margin ciliate, rather obtuse, upper ones erect or ascending, about 3 cm. long. *Inflorescence* with about 3—8 flowers. *Flowers* inodorous, with short pedicels, about 1·5 cm. in diameter; July to early September. *Epicalyx* of 2 segments; segments narrow, acuminate, about as long as the calyx, not closely appressed to the calyx. *Calyx* strongly veined, segments acuminate. *Petals* deep red with paler spots, not contiguous, 9; limb narrow, gradually passing into the claw, irregularly toothed above. *Stigmas* as long as the ovary. *Capsule* opening by 5 short teeth, cylindrical. *Seeds* oval, tuberculate.

This species connects *Tunica* with *Dianthus*, as shown particularly by the nature of the epicalyx.

Though the plant has long been known in books as the Deptford pink, it would appear from Mr Britten that it is not the original plant from that town (*Journ. Bot.* xxx, 177 (1892)). The name "Deptford pink" was first used by Johnson (*op. cit.*) in 1603: it was then applied by him to an undoubted figure (t. 11, p. 594) of *D. armeria*; but the corresponding letterpress (p. 596), taken from the first edition of Gerard's *Herball* (p. 476), refers to *D. deltoïdes*.



Map 36. Distribution of *D. armeria* in Great Britain

Local; hedgebanks, rocky slopes, old walls, limestone hills, sandy and gravelly ground, wood-clearings, drying-up fens, and waste places; no doubt indigenous in many of its stations, but often a garden-escape or otherwise adventitious, and often disappearing and reappearing in its stations; from the Channel Isles, Cornwall, and Kent northwards to Perthshire and Forfarshire. Not in Ireland.

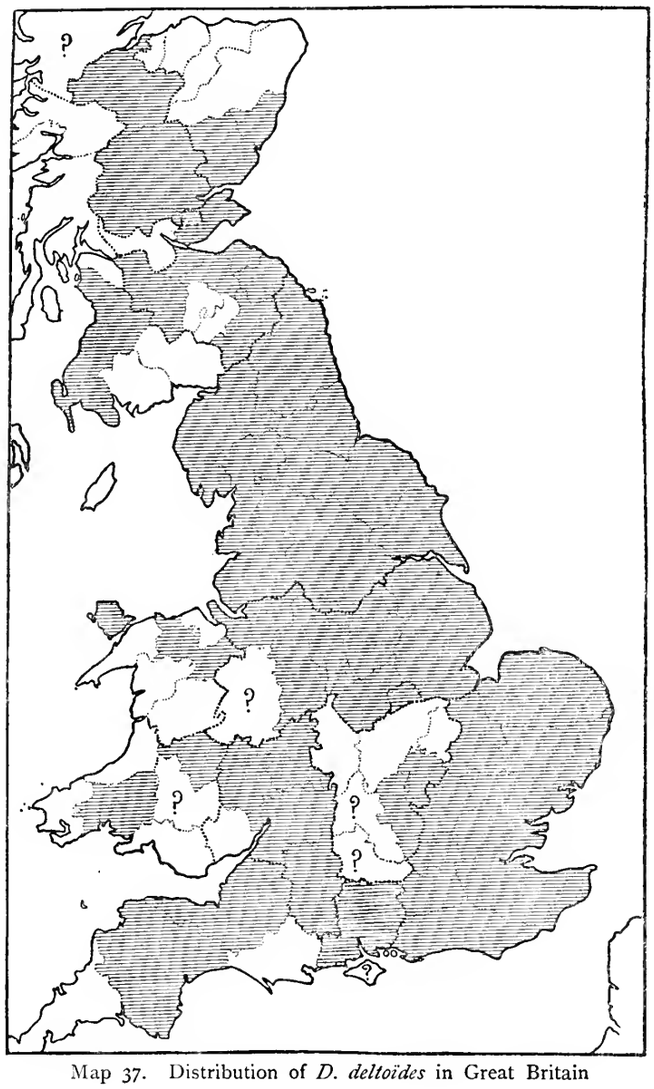
Southern Sweden (N. to 56°), Denmark, Germany, Holland, Belgium, France, central Europe, Russia (central and southern), southern Europe; south-western Asia; North America (not indigenous).

## 2. DIANTHUS DELTOÏDES. Maiden Pink. Plate 87

*C. pratensis noster major* Parkinson *Theatr. Bot.* 1338 (1640); *C. minor repens nostras* Ray *Syn.* ed. 3, 335 (1724); *Tunica ramosior flore candido cum corolla purpurea* Dillenius *Hort. Eltham.* 400, t. 298, fig. 384 (1732).

**Dianthus deltoïdes** L. *Sp. Pl.* 411 (1753); Smith *Fl. Brit.* 462 (1800)!; Syme *Eng. Bot.* 46 (1864); Rouy et Foucaud *Fl. France* iii, 175 (1896).

Perennial. *Shoot* laxly tufted, more or less glaucous, somewhat pubescent. *Laminae* of the barren shoots oblong; of the erect branches lanceolate, subconnate, scabriusculous, upper ones very acute, about 2·5 cm. long and 3—4 mm. broad. *Inflorescence* with 1—4 flowers. *Flowers* slightly odorous, about 1·7—2·0 cm. in diameter; June to August. *Epicalyx* appressed to the calyx, with 2 or 4 segments; segments ovate-acuminate, pale below, green above with narrow pale margins, about half as long as the calyx-tube. *Calyx* cylindrical, furrowed, furrows pale, ridges green; tube about 1 cm. long and 3 mm. in diameter; segments acuminate, about 5 mm. long. *Petals* rose-purple or white, with a dark ring near the base of the limbs, not contiguous, dentate; limbs subrhomboidal, the 2 upper sides toothed and shorter than the two lower ones. *Capsule* cylindrical. *Seeds* small, punctate.



Map 37. Distribution of *D. deltoïdes* in Great Britain

(*a*) **D. deltoïdes** var. **genuinus** Syme *Eng. Bot.* ii, 46 (1864); *D. deltoïdes* L. *loc. cit.*, in sensu stricto!; *D. deltoides* var. *typicus* Williams in *Journ. Linn. Soc.* xxix, 419 (1893);

Icones:—Smith *Eng. Bot.* t. 61; *Fl. Dan.* t. 577; *Svensk Bot.* t. 477; Reichenbach *Icon.* vi, t. 263, fig. 5040.

*Camb. Brit. Fl.* iii. *Plate 87.* (*a*) Barren shoot. (*b*) Fertile shoot. (*c*) Portion of stem (enlarged). (*d*) Portion of leaf (enlarged). (*e*) Flower. (*f*) Petal. (*g*) Mature fruit. (S. H. B.)

Exsiccata:—Billot, 2423; Bourgeau (*Pl. d'Esp.*), 2268; Duchartre (*Fl. Pyr.*), 2; Fries, vii, 31; v. Heurck et Martinis, vi, 251; Huet (*Pl. Neap.*), 279; Huter (*It. Ital.* iii), 464; Thielens et Devos, iv, 305; Todaro, 319, as *D. deltoïdes* var. *biflorus*; *Herb. Fl. Ingr.* i, 89.

*Shoot* scarcely glaucous, dark green. *Epicalyx* with 2 segments. *Petals* rose-purple, rarely white.

This is the usual form of the species.

(*b*) **D. deltoïdes** var. **glaucus** [Seringe ms. ex] DC. *Prodr.* i, 361 (1824); Syme *Eng. Bot.* ii, 46 (1864); Rouy et Foucaud *Fl. France* iii, 176 (1896); *D. glaucus* L. *Sp. Pl.* 411 (1753)!; Hudson *Fl. Angl.* 161 [bis] (1762); ed. 2, 185 (1778) partim; Withering *Bot. Arr.* 255 (1776); ed. 2, 443 (1787); Lightfoot *Fl. Scot.* 225 (1777); et auctorum plurimorum.

Icones:—Reichenbach *Icon.* t. 263, fig. 5041, as *D. glaucus.*

*Shoot* markedly glaucous. *Epicalyx* with 4 segments. *Petals* white, marked with a purplish line towards the base of the limb.

For remarks on the nomenclature of *Dianthus glaucus*, see the next page.

We have seen no fresh specimens of this variety; but, judging from the descriptions of it, it would seem to be as worthy of specific rank as many forms of *Dianthus* usually regarded as species. As will be seen from the synonyms cited above, Linnaeus accorded it the rank of a species.

Very rare, and "a doubtful native" (Syme *op. cit.* 47 (1864)); Surrey, Yorkshire, Edinburghshire.

Norway, Germany, Denmark, France, central Europe, Russia, Spain; North America (not indigenous).

Grassland on dry, sandy soils; local, from Devonshire and Kent northwards to Inverness-shire; not known in Ireland.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia (central and southern), southern Europe (ascending to 1600 m. in the Pyrenees); Asia; North America (not indigenous).

## 3. DIANTHUS CAESIUS. Cheddar Pink. Plate 88

*Tunica rupestris folio caesio molli flore carneo* Dillenius *Hort. Eltham.* 400, t. 298, fig. 385 (1732).

**Dianthus caesius** Smith *Eng. Bot.* no. 62 (1792)!; in *Trans. Linn. Soc.* ii, 302 (1794); *Fl. Brit.* 463 (1800); Syme *Eng. Bot.* ii, 48 (1864); Rouy et Foucaud *Fl. France* iii, 174 (1896) excl. syn. *D. gratianopolitanus* Villars; *Hist. Pl. Dauph.* iii, 598 (1789); *D. virgineus* var. *β* L. *Sp. Pl.* 412 (1753); *D. glaucus* Hudson *Fl. Angl.* 161 [bis] (1762) excl. diag.; ed. 2, 185 (1778) partim, pro min. part., non L.

Icones:—Smith *Eng. Bot.* t. 62; Reichenbach *Icon.* vi, t. 265, fig. 5044.

*Camb. Brit. Fl.* iii. *Plate 88.* (*a*) Barren and flowering shoots. (*b*, *c*) Fertile shoots. (*d*) Portion of leaf (enlarged). (*e*) Petal. (*f*) Ovary. (*g*) Mature fruit. Somerset.

Exsiccata:—Billot, 935 et 935 bis; Michalet (*Fl. Seq. Exsicc.*), 26; (*Pl. Jura*), 60; Reichenbach, 798; 2293; Thielens et Devos, ii, 104. (All as *D. caesius.*)

Perennial. *Shoot* strongly glaucous, up to 1—3 dm. high. *Leaves* linear, connate at the base, margin scabriusculous, apex acute, up to 4—5 cm. long and 3—4 mm. broad. *Inflorescence* with 1—3 flowers. *Flowers* odorous, protandrous, about 2·5 cm. in diameter; late May to early July. *Epicalyx* appressed, with 4 segments, about 5 mm. high, the outer pair obovate and longer and overlapping the inner pair, about one-third to one-quarter as long as the calyx-tube, all mucronate. *Calyx* faintly veined; tube about 1·8 cm. long and 4 mm. broad; teeth nearly oblong, about 2—4 mm. long. *Petals* rose-pink or pink, with a distinct whitish claw, nearly contiguous, either shortly or deeply and rather irregularly toothed. *Stamens* of different lengths, ultimately about as long as the calyx, filaments white, anthers subversatile and yellowish. *Capsule* cylindrical. *Styles* white, ultimately as long as the ovary and protruding. *Seeds* large, punctate.

If the Cheddar pink is really indigenous in Somerset—and we know of no British botanist who has denied this—the plant is one of a number of interesting central European species whose British distribution is restricted to the vicinity of the Bristol Channel. The following are examples of the species in question:—*Dianthus caesius*, *Paeonia mascula* (= *P. corallina*), *Arabis stricta*, *Draba aïzoïdes*, *Euphorbia pilosa*, *Stachys alpina*, *Hieracium lima*, *H. stenolepis*, *Koehleria vallesiana*, *Allium sphaerocephalum.* Several of these species are open to a more or less strong suspicion of having been introduced, whilst others are unquestionably indigenous; and it is by no means easy to decide in which of these two categories the Cheddar pink should be placed. The continental distribution of the plant is rather against its being considered native in Somerset; but, on the other hand, the plant has the appearance of an aboriginal in three localities on the limestone cliffs of the Mendip Hills.

Various binominals have in recent years been brought into conflict with the name of *Dianthus caesius* of Smith. Of these, perhaps the most serious competitor is "*D. glaucus* Hudson." The binominal *D. glaucus* appears first in the *Species Plantarum* of Linnaeus (p. 411 (1753)): here *D. glaucus* refers to a plant closely allied to *D. deltoïdes* L., and with regard to which (see p. 90) we follow de Candolle and Syme in reducing it to a variety (var. *glaucus*) of *D. deltoïdes.* In this first edition of the *Species Plantarum* (412 (1753)), Linnaeus names the Cheddar pink *D. virgineus* var. *β.* Linnaeus had never seen the plant he so named, but merely used a description and figure of Dillenius (*loc. cit.*). Linnaeus makes no change in the second edition of the *Spec. Plantarum*, apart from adding the word "brevibus" ("squamis...brevibus") to his original diagnosis of *D. glaucus.* It is, we believe, admitted by all that the *D. glaucus* of both editions of Linnaeus's *Spec. Plantarum* refers to one and the same plant (namely, to *D. deltoïdes* var. *glaucus* DC.). Now Hudson, in the first edition of his *Fl. Anglica* (p. 161 [bis] (1762)) has a *D. glaucus*; and this is unquestionably based on *D. glaucus* Linn., for Hudson repeats—*ipsissima verba*—the diagnosis and synonyms of Linnaeus, even to the extent of copying the erroneous citation (t. 348 for t. 384) from Dillenius. It is true that Hudson adds the locality "on Cheddar rocks," and so perhaps adds *D. caesius* Smith to *D. glaucus* Linn.; but this inclusion is not certain, as two or three species of *Dianthus* have been recorded from Cheddar (vide Hudson *loc. cit.*, sub nominibus *D. glauco* et *D. arenario*, et vide Withering *Bot. Arr.* ed. 2, 444 (1787) sub nomine *D. glauco*). However in the second edition of his *Fl. Anglica* (p. 185 (1785)), Hudson substitutes another Dillenian name for the one utilised by Linnaeus; and the substituted name undoubtedly refers to *D. caesius.* It has to be admitted therefore that the *D. caesius* of Smith is the *D. glaucus* of Hudson in part; but as Hudson's diagnosis[1] remains unchanged (i.e., as it remains the diagnosis of the original *D. glaucus* Linn.), we cannot allow the name "*D. glaucus* Hudson" to supersede Smith's name of *D. caesius.* The fact is that Hudson blundered in his allocation of the name *D. glaucus* Linn.; and his later substitution of another Dillenian synonym was merely a cloak apparently manufactured with the intention of hiding his original mistake. Again, the name *D. glaucus* was formerly kept up as a species by many botanists, and it may well be that some future botanists will revert to this view—a view which is not at all unreasonable; and should they do so, they will rightly claim the name *D. glaucus* for their plant.

Another name has also come into conflict with *D. caesius*, viz., *D. gratianopolitanus* Villars (*loc. cit.*). This name was taken up by the late Rev. R. P. Murray in the text (p. 44) of his *Flora of Somerset*, but not on the frontispiece of that work where the name *D. caesius* is used. On this matter we agree with N. E. Brown who states (*Eng. Bot.* ed. 3, suppl. additions and corrections, p. v (1892)) that "the description of *D. gratianopolitanus* does not agree at all with *D. caesius.*"

It may also be (since some authorities regard *D. virgineus* L. excl. var. *β* as undeterminable) that the name *D. virgineus* will enter the arena in conflict with *D. caesius*, though we ourselves would have no sympathy with the view that *D. virgineus* should displace *D. caesius.*

It only remains to add that Smith's name *D. caesius* is in general use, and is perfectly definite and clear, and that the names proposed to supersede it are shrouded in ambiguity or error.

[1] Cf. the footnote on p. 83.

Rare and very local, Somerset; on grassy ledges of rocks of Carboniferous Limestone on the Mendip Hills, near Cheddar and in two other stations, where the plant grows among indigenous vegetation; introduced on the St Vincent Rocks, near Bristol, and in a quarry, near Cannington; commonly planted on old village-walls at the foot of the central and western Mendips, and to a less extent in other parts of the county.

Belgium (on sandstone as well as limestone), central and eastern France, southern and eastern Germany (including north-eastern), central Europe (ascending to 1800 m. in Switzerland), northern Italy.

## 4. †DIANTHUS GALLICUS. Plate 89

**Dianthus gallicus** Persoon *Syn.* i, 495 (1805); Rouy *Fl. France* iii, 180 (1898); Williams in *Journ. Bot.* xxxvi, 493 (1898).

Icones:—DC. *Icon. Gall. Rar.* t. 41, as *D. arenarius.*

*Camb. Brit. Fl.* iii. *Plate 89.* (*a*, *b*, *c*) Fertile branches. (*d*, *e*, *f*) Petals. (S. G., Jersey.)

Exsiccata:—Billot, 936; Lange, 360.

Perennial. *Shoot* more or less glaucous; flowering branches 1—3 dm. high. *Stem-leaves* linear, ciliolate, acute, about 3 cm. long. *Inflorescence* with 1—3 flowers. *Flowers* usually solitary, odorous, about 3 cm. in diameter; July and August. *Epicalyx* with 4 rather loose segments, obovate and mucronate, about a quarter as long as the calyx. *Calyx* rather strongly veined. *Petals* rose or white, almost contiguous, somewhat fimbriate. *Seeds* punctate.

Very rare, a single rather large patch on fixed dunes in St Ouen's Bay, Jersey.

Western France, north-western Spain, Portugal.

## 5. *DIANTHUS PLUMARIUS. Wild Pink. Plate 90

**Dianthus plumarius** L. *Sp. Pl.* 411 (1753)!; Leighton *Fl. Shropshire* 188 (1841); Babington *Man.* 40 (1843); Syme *Eng. Bot.* ii, 50 (1864).

Icones:—Babington in *Eng. Bot. Suppl.* t. 2979; Reichenbach *Icon.* t. 257, fig. 5029 et fig. 5030.

*Camb. Brit. Fl.* iii. *Plate 90.* (*a*) Portion of plant with barren and flowering branches. (*b*, *c*) Flowering branches. (*d*) Portion of leaf (enlarged). (*e*) Petal. (*f*) Ovary. Hort., origin Carnarvonshire. (S. H. B.)

Exsiccata:—Billot, 3534; Schultz (*Herb. Norm.*), ix, 828, et ix, 828 bis.

Perennial. *Shoot* somewhat glaucous, caespitose. *Stem-leaves* connate, linear, margins minutely scabriusculous, acute, about 2—4 cm. long and 0·3—0·4 broad, longer than those of the barren shoots. *Inflorescence* with 1—3 flowers. *Epicalyx* appressed, with 4 segments, about a third as long as the calyx-tube; segments cuspidate. *Flowers* about 3 cm. in diameter; June and July. *Gynophore* distinct. *Petals* pale rose-pink, with darker veins, scarcely contiguous, apex fimbriate with deep narrow irregular and acuminate teeth. *Stamens* longer than the corolla-tube, filaments white, anthers slate-coloured, basal glands yellow. *Stigmas* white, longer than the ovary. *Seeds* flat, orbicular, with a point on one side.

Not indigenous; naturalised on old walls in Surrey, Kent, Essex, Shropshire, Carnarvonshire.

Central Europe, central and southern Russia. Not indigenous in western Europe.

## 6. *DIANTHUS CARYOPHYLLUS. Clove Pink or Wild Carnation. Plate 91

*Caryophyllus simplex flore minore pallide rubente* Ray *Syn.* ed. 3, 336 (1724).

**Dianthus caryophyllus** L. *Sp. Pl.* 410 (1753)!; Smith in *Trans. Linn. Soc.* ii, 299 (1794); *Eng. Bot.* no. 214 (1794)!; *Fl. Brit.* 461 (1800); Syme *Eng. Bot.* ii, 49 (1864); Rouy et Foucaud *Fl. France* iii, 192 (1896).

Icones:—Smith *Eng. Bot.* t. 214; Baxter, ii, 81; Reichenbach *Icon.* t. 268, fig. 5051.

*Camb. Brit. Fl.* iii. *Plate 91.* (*a*) Barren shoot. (*b*, *c*) Flowering branches. (*d*) Petal. (*e*) Ovary. Kent (G. B.).

Exsiccata:—Billot, 726; Reichenbach, 2294.

Perennial. *Shoot* tufted, rather glaucous, glabrous, up to 8 dm. high. *Leaves* lanceolate to broadly linear, connate, margins smooth, acute, up to about 5 cm. long and 4 mm. broad. *Inflorescence* with 1—6 flowers. *Flowers* about 3·0—3·5 cm. in diameter, odorous; late June to August. *Epicalyx*

with 4 appressed segments; outer segments smaller and darker; inner segments obovate-mucronate, about one-third to one-fourth as long as the calyx-tube. *Calyx* faintly veined; tube cylindrical, about 1·5—2·0 cm. long and 4 mm. broad; segments broadly triangular, about 4 mm. long. *Petals* rose or white, toothed, contiguous or nearly so. *Capsule* broadly cylindrical. *Seeds* strongly punctate.

Not indigenous; walls of Rochester Castle, Kent.

France, Spain, Italy, south-eastern Europe. Naturalised in many other parts of temperate Europe.

## Subclass 4. *HETEROCHLAMYDEAE*

**Heterochlamydeae** Moss in Carter *Gen. Brit. Plants* 45 (1913); *Cambr. Brit. Fl.* ii, 3 (1914); Grove *Syn. Fam. Brit. Plants* 17 (1915); *Dicotyledoneae Bd* Engler *Syll.* ed. 2, 115 (1898).

*Inflorescence* cymose or racemose, rarely solitary. *Flowers* usually monoclinous, usually cyclic, sometimes spiral (as in some of the more primitive forms). *Perianth* usually dichlamydeous and heterochlamydeous, rarely (as in some of the more primitive forms and also in reduced forms) monochlamydeous; if dichlamydeous, corolla usually polypetalous (but cf. *Cotyledon*); if monochlamydeous, either petaloid (usually in the primitive forms) or sepaloid (usually in the reduced forms); rarely absent. *Pollination* usually entomophilous, less often (and usually in the reduced forms) anemophilous or antophilous. *Stamens* few or many. *Ovary* usually syncarpous, less often (as in the more primitive forms) apocarpous or syncarpous only at the base. *Fertilisation* porogamous or very rarely (as in *Alchemilla*) mesogamous. *Seeds* usually not campylotropous, sometimes produced apogamously (e.g., in *Alchemilla* spp.). *Integument of seed* double or single.

There is at present no very satisfactory classification to offer of the sub-class *Heterochlamydeae*. The difficulties of classifying the group are to a great extent inherent, and due to the following causes. The number of species, genera, and families of the sub-class is very great; and whilst the general characters of these groups are fairly well known, yet the gaps between many of them are very small; and even when this is not so there is often inadequate knowledge of the development and systematic value of the separating characters. What to the ordinary eye may seem an identical character, e.g., an indefinite number of stamens, may arise in various ways; and it is often the development of such a character and the interpretation placed upon that which determine whether the character be regarded as primitive or derived; and upon that conclusion may depend the place accorded in a modern system of classification to a given group of plants.

Unless the following orders and groups of orders are closely studied from the point of view of their genetical relationships to one another, and unless an attempt is made to trace the various evolutionary tendencies within the limits of each group, the significance of the classification here adopted (following Engler's *Syllabus*) cannot be understood. It will tend to a more correct apperception of the arrangement if it is supposed that, in general, groups of equivalent value have arisen from a common stock, and that it is therefore the case that the more primitive members of the different equivalent groups are frequently more closely allied to each other than the more primitive members of a given group to the more specialised members of that group.

For characters of the *Heterochlamydeae*, see also Volume II, page 3. For subclass 1 (*Amentiflorae*), see Volume II, page 2 and page 3. For subclass 2 (*Petaloideae*), see Volume II, page 2 and page 103. For subclass 3 (*Centrospermae*), see Volume II, page 2 and page 150.

### British orders of *Heterochlamydeae*

(α) *Order with prevailing hypogyny and apocarpy*

Order 1. **Ranunculales** (or *Ranales*) (p. 95). *Receptacle* usually more or less convex. *Inflorescence* usually cymose or solitary. *Flowers* spiral to hemicyclic and cyclic, monochlamydeous (the primitive condition) to heterochlamydeous, usually actinomorphic, rarely zygomorphic, hypogynous to hemi-epigynous and epigynous. *Stamens* usually ∞. *Carpels* ∞ to 1, free from the other parts of the flower, and usually apocarpous. *Integuments* of the seed 1 or 2.

The more primitive members of the order have a definite inflorescence, a convex receptacle with the parts of the flower placed upon it, monochlamydeous and hypogynous flowers with numerous free stamens and carpels arranged spirally. Specialisation can be traced in the reduction of the inflorescence, in the receptacle becoming somewhat concave, in the transitions from the spiral to the cyclic arrangement of the parts of the flower, in the development of a corolla from stamens to "nectar-leaves" or staminodes and ultimately to petals, in the reduction of the number of the members of the androecium and gynoecium, and rarely in the cohesion of the carpels, or the adhesion of carpels and calyx giving rise to the hemi-epigynous condition. The order is closely related to the more primitive members of the *Rosales* and *Hypericales*.

(β) *Order with prevailing hypogyny and syncarpy*

Order 2. **Papaverales** (or *Rhoeadales*) (p. 156). *Leaves* spiral, exstipulate. *Inflorescence* usually racemose or solitary. *Flowers* usually cyclic, the androecium occasionally remaining spiral,

heterochlamydeous except rarely monochlamydeous by reduction, hypogynous, the parts often in whorls of 2 or 4. *Carpels* ∞—2, usually superior, syncarpous. *Integuments* 2.

The order has probably arisen directly from Ranunculalian-like ancestors.

Order 3. **Sarraceniales** (see Volume IV). Insectivorous herbs. *Flowers* hemicyclic to cyclic, homochlamydeous to heterochlamydeous, actinomorphic, hypogynous. *Carpels* 3—5, syncarpous, with parietal or axile placentation. *Seeds* ∞, minute, with endosperm.

Like the *Papaverales*, this order also has probably arisen from Ranunculalian-like ancestors.

(γ) *Order with hypogyny and apocarpy still occurring in the more primitive forms, but with increasing frequency of perigyny and hemi-epigyny due to the hollowing of the receptacle*

Order 4. **Rosales** (see Volume IV). *Receptacle* usually more or less concave. *Flowers* hemicyclic (as in the subfamily *Rosoïdeae*) to cyclic (usually), heterochlamydeous except rarely monochlamydeous by reduction (as in *Alchemilla* and *Poterium*), actinomorphic to zygomorphic, hypogynous to hemi-epigynous. *Stamens* often ∞. *Carpels* often ∞, usually apocarpous. *Placenta* often thick. *Ovules* often ∞.

This is a very large order, the family *Viciaceae* (or *Leguminosae*) alone containing nearly 12,000 species. The more primitive members of the order are characterised by hypogyny, numerous stamens and carpels, and apocarpy: they thus have several features in common with the more primitive members of the *Ranunculales* and both groups doubtless diverged from a common ancestral stock. Zygomorphy, coalescence of the stamens, perigyny, and hemi-epigyny are, however, of much more frequent occurrence in the higher members of the *Rosales* than of the *Ranunculales*.

It appears to us that the preceding three groups of orders (α, β, and γ) might appropriately be united under the name *Ranunculariae*.

(δ) *Order with hypogyny usually persisting but apocarpy rare, with prevailing syncarpy, with prevailing oligomery of the essential whorls, and with pleiomery rare*

Order 5. **Geraniales** (see Volume VI). Herbs in all the British forms. *Flowers* cyclic, primitively heterochlamydeous, rarely monochlamydeous or even achlamydeous (e.g., in *Euphorbia*) by reduction, usually pentamerous. *Carpels* 5—2, usually syncarpous. *Ovules* rarely ∞, usually 2 or 1, anatropous, pendulous; raphe either ventral and micropyle directed upwards, or (when more than 1 ovule is present) with single ones showing raphe dorsal and micropyle directed downwards.

Order 6. **Sapindales** (see Volume VI). Closely allied to *Geraniales*, but (in the British forms) all woody plants except *Impatiens*, differing from *Geraniales* in the orientation of the ovule which is either pendulous with the raphe dorsal and the micropyle directed downwards, or ascending with the raphe and the micropyle directed downwards.

Order 7. **Rhamnales** (see Volume VI). *Flowers* tetracyclic, heterochlamydeous or monochlamydeous by reduction. *Stamens* in 1 whorl, antipetalous. *Carpels* 5—2, syncarpous, each with 2—1 ovules. *Ovules* ascending; raphe dorsal, lateral, or ventral; integuments 2.

Order 8. **Malvales** (see Volume VI). *Flowers* cyclic, except sometimes the androecium, heterochlamydeous, monoclinous, usually actinomorphic, rarely zygomorphic. *Calyx* usually pentamerous, sepals usually valvate in bud. *Corolla* usually pentamerous. *Stamens* either in 2 whorls with the inner one branched, or ∞. *Carpels* 2—∞, usually syncarpous; ovules ∞—1, anatropous; integuments 2.

This fourth group of orders (δ) seems rather out of place here, being less obviously connected with the first three groups (α, β, and γ) of orders than those are to the fifth group of orders (ε). However, it is a natural group on the whole. The *Geraniales* and *Sapindales* are without doubt closely allied; and it is indeed a question whether or not they should not be reduced to a single order. As it is, they are only separable by the orientation of the ovules; and even this character breaks down in those cases (e.g., *Aesculus*) where there are more ovules than one in the ovary. According to Coulter and Chamberlain (*Morphology of the Angiosperms*, p. 248), the significance of this character is not clear; "but its constancy is in its favour." The order *Rhamnales* is doubtless related to the two which precede it; but is easily distinct from a merely systematic point of view, owing to the tetracyclic flowers and the antipetalous stamens. Similarly, the *Malvales* are probably not incorrectly placed, though the numerous stamens of the *Malvaceae* are probably due to splitting: the non-British *Sterculiaceae* are more primitive than the *Malvaceae*, and show more or less incomplete carpellary fusion.

This group of orders might well be designated the *Sapindariae*.

(ε) *Orders with prevailing spirocycly or of 5—4 flower-whorls, with apocarpy in the more primitive (non-British) orders, and with a tendency to hemi-epigyny due to the sinking of the gynoecium in the axis*

Order 9. **Hypericales** (or *Parietales*) (see Volume VI). *Flowers* hemicyclic (in the more primitive forms which are related to the lower *Ranunculales* and lower *Rosales*) or cyclic. *Stamens* often ∞. *Carpels* often ∞, more or less united; placentae parietal, sometimes meeting in the middle; ovules rarely basal.

The diverging lines of development in this order are well exhibited in Engler's suborders of the group. The numerous stamens of, for example, the *Dilleniaceae* and the *Cistaceae*, may well be primitive, and probably indicate a common ancestry with the *Ranunculales*. In the more specialised (non-British) families gamopetaly and epigyny occur.

An allied order is the *Cactales* (or *Opuntiales*) which is not represented in the British flora, though visitors to the Riviera must all have noticed the naturalised Opuntias in the hedgerows there. It is the only order of the *Heterochlamydeae* (as at present limited) not represented in the British flora.

The group might well be designated the *Hypericarieae*, and should probably be placed nearer the *Ranunculales* and *Papaverales*.

(ζ) *Orders with cyclic flowers and with prevailing hemi-epigyny or epigyny due to the hollowing of the axis and the union of the gynoecium and the axis, and with prevailing syncarpy*

Order 10. **Myrtales** (or *Myrtiflorae*). [*Stem* often with bicollateral vascular bundles.] *Receptacle* concave. *Flowers* cyclic, heterochlamydeous or rarely monochlamydeous by reduction, usually actinomorphic, haplostemonous or diplostemonous. *Gynoecium* syncarpous, usually united to the axis.

Order 11. **Apiales** (or *Umbelliflorae* or *Umbellales*). *Inflorescence* usually an umbel, which may be simple or compound. *Flowers* cyclic, heterochlamydeous, tetramerous or pentamerous, usually haplostemonous, epigynous. *Carpels* 5—1, syncarpous, each with 1 (or rarely 2) ovules. *Ovules* pendulous, anatropous; integument 1; endosperm copious.

This group of orders—which may be designated the *Myrtariae*—is well placed at the end of the *Heterochlamydeae*, as it is without doubt the most specialised. The specialised characters are the tetracyclic flowers, the cyclic stamens, the perigyny and epigyny. Indeed, the group is in some ways more highly specialised than some orders of the *Metachlamydeae* (or *Gamopetalae*), namely, the *Ericales* and the *Primulales*. In particular, the specialised characters are well displayed by the *Apiaceae* (or *Umbelliferae*). The group is closely related to the epigynous orders of the *Metachlamydeae* (or *Gamopetalae*), especially to the *Rubiales*; and this indeed is one of the major relationships which is well exhibited in de Candolle's and Bentham and Hooker's system of classification. However, the relationship to the preceding groups of orders is not clear.

## Order 1. RANUNCULALES

**Ranunculales** nobis; *Ranales* Lindley *Nat. Syst.* ed. 2, 4 (1836) incl. *Berberales*; Bentham and Hooker *Gen. Pl.* i, p. vi (1862); Engler *Pflanzenfam. Nachtr.* 347 (1897); Carter *Gen. Brit. Plants* 45 (1913).

For characters, see page 93.

### British families of *Ranunculales*

Family 1. **Nymphaeaceae** (see below). Rooted aquatic plants. *Flowers* large (about 3—15 cm.). *Stamens* 6—∞, anthers introrse. *Carpels* 3—∞. *Seeds* ∞.

Family 2. **Ceratophyllaceae** (p. 100). Rootless submerged aquatic plants. *Leaves* all submerged. *Flowers* monochlamydeous, small (up to about 4 mm.). *Petals* or *nectar-leaves* absent. *Anthers* extrorse. *Carpel* 1. *Seed* 1.

Family 3. **Ranunculaceae** (p. 103). *Sepals* usually 3—6, often 5, usually petaloid. *Inflorescence* cymose or solitary. *Staminodes* or *nectar-leaves* or *petals* sometimes absent; when present, usually more or less linear, or (as in *Ranunculus*) with a broad coloured petal-like limb. *Stamens* 5—∞, usually ∞, hypogynous; anthers extrorse. *Carpels* usually ∞. *Fruit* an achene or follicle.

Family 4. **Actaeaceae** (p. 152). *Inflorescence* racemose. *Flowers* heterochlamydeous. *Sepals* petaloid, caducous. *Petals* small. *Stamens* ∞, hypogynous; anthers introrse. *Carpel* 1. *Fruit* succulent.

Family 5. **Berberidaceae** (p. 153). *Sepals* $n+n$. *Petals* or *nectar-leaves* $n+n$. *Stamens* hypogynous, $n+n$; anthers introrse. *Carpels* 1. *Fruit* succulent. ($n=3$ or 2.)

Family 6. ***Paeoniaceae** (p. 155). *Sepals* 5, unequal in size. *Petals* 5—10, very large, without nectary. *Stamens* ∞, hemi-perigynous, attached to a disc, anthers extrorse. *Carpels* 2—5. *Fruit* follicular, large and often hairy.

### Family 1. NYMPHAEACEAE

**Nymphaeaceae** DC. *Ess. Propr. Medic. Pl.* ed. 2, 119 (1816); *Théor. Élem.* 243 (1819); Bentham and Hooker *Gen. Pl.* i, 45 (1862); Caspary in Engler und Prantl *Pflanzenfam.* iii, pt. 2, 1 (1891); *Nymphaeëae* Salisbury in *Ann. Bot.* ii, 69 (1806).

Perennial, aquatic herbs. *Rhizomes* stout. *Leaves*—some submerged, some floating, sometimes emergent, all with petioles and simple peltate laminae, margin of the lamina involute (at least in bud),

arising from the rhizome. *Inflorescence* solitary, with a long peduncle with a rudimentary bract at the base, arising from the rhizome. *Receptacle* convex or hollow. *Flowers* large, showy, the parts often spirally arranged, rarely trimerous. *Perianth* showing a tendency to become heterochlamydeous, with 6—∞ segments. *Stamens* 6—∞, showing a tendency to become petaloid; anthers introrse; connective sometimes prolonged. *Carpels* 3—∞, apocarpous (as in the exotic *Nelumbo*) or syncarpous and multilocular, superior (as in *Nuphar*) or semi-inferior (as in *Nymphaea*) or inferior (as in the exotic *Victoria*). *Ovules* usually anatropous, rarely orthotropous. *Fruit* a head of achenes (as in *Nelumbo*) or many-seeded and indehiscent, or dehiscing irregularly. *Pericarp* thick (except in *Nelumbo*) dry or mucilaginous. *Seeds* with endosperm and perisperm (except in *Nelumbo*), sometimes with an aril. *Cotyledons* thick. *Radicle* short.

Several botanists have felt more or less strongly inclined to refer the family *Nymphaeaceae* to the *Monocotyledones* rather than to the *Dicotyledones*. This is apparently quite an old view, for, as Smith (*Eng. Fl.* iii, 16 (1825)) states, Linnaeus at first regarded the plants as monocotyledonous; but Linnaeus altered his view later. The characters of the *Nymphaeaceae* which suggest the monocotyledons are the tendency to trimerous flowers in some genera, and the scattered and closed vascular bundles of the stem in other genera, though other less convincing characters have also been mentioned in this connection. An account of the *Nymphaeaceae* from this point of view is given by M. T. Cook in the *Bot. Gazette* xlii, 376—392 (1906). However, the monocotyledons and dicotyledons are so very closely allied that it is easy to over-emphasize the importance of the characters which are used to separate the two groups. Sir J. E. Smith's remark (*loc. cit.*) on the subject is singularly *naive*: the *Nymphaeaceae*, he states, do not correspond "uniformly with the *Monocotyledones* and *Dicotyledones*..., as it is much to be wished they could have done."

The British species belong to the subfamily *Nymphaeoïdeae* (Caspary *op. cit.* p. 4 et p. 6), with united carpels and seeds with endosperm and perisperm.

8 genera, and about 60 species; cosmopolitan.

### British genera of *Nymphaeaceae*

Genus 1. **Nuphar** (see below). *Perianth-segments* yellow at least on the inside, springing from the receptacle, furrowed, with nectaries on the outside. *Ovary* superior. *Pericarp* hard, shining. *Seed* with no aril.

Genus 2. **Nymphaea** (p. 98). *Perianth-segments* white (in the British species) or red or blue at least on the inside, arising from the carpels. *Ovary* semi-inferior, with nectaries on the stigma. *Pericarp* soft. *Seed* with an aril.

## Genus 1. Nuphar

**Nuphar** Smith in Sibthorp and Smith *Prodr. Fl. Graec.* i, 361 (1808 or more probably 1809, but the title-page dated 1806); *Eng. Bot.* no. 2292 (1811); Caspary *op. cit.* 9 (1891); *Nymphaea* [Tournefort *loc. cit.* partim;] L. *loc. cit.* partim; Salisbury in *Ann. Bot.* ii, 71 (1806) non Smith; *Nymphozanthus* L. C. Richard *Démonstr. Bot.* 68 (May, 1808); *Nymphona* Bubani *Fl. Pyr.* iii, 260 (1901).

Perennial, aquatic herbs with stout rhizomes and floating laminae. *Petioles* long, springing from the rhizome. *Laminae* markedly cordate at the base; those of the floating leaves smaller than those of the submerged leaves. *Sepals* 5—12, converging above. *Petals* ∞, staminodal, much smaller than the sepals, in 2 whorls, inserted on the thalamus. *Anthers* ∞, filaments broadly ligulate, anthers introrse, inserted on the thalamus. *Ovary* superior, bottle-shaped. *Fruit* with as many loculi as there are stigmas, without external scars, ripening above water, not becoming mucilaginous, indehiscent. *Seeds* ∞ in each loculus.

In recent years, some confusion has arisen regarding the names of the two British genera of *Nymphaeaceae*, which we, following most authorities, designate *Nuphar* and *Nymphaea*. Linnaeus and his predecessors placed all the plants in question in a single genus which was called *Nymphaea*. Later, Salisbury (*loc. cit.* 1806) separated the aggregate genus into two, and retained the name *Nymphaea* for the yellow water-lilies, whilst our white water-lily he placed in a genus which he named *Castalia*. Smith (*loc. cit.* 1808 or 1809) kept the name *Nymphaea* for the genus containing our white water-lily, and named the yellow water-lilies *Nuphar*. Smith's allocation of names has been followed by nearly all later botanists. Recently Greene (*Bull. Torr. Bot. Club* xiii, 257 (1886)) has proposed the restoration of Salisbury's names. Greene contends for the principle of priority: he states that "in nomenclature...the oldest Linnaean or post-Linnaean names are those which genera must bear." Greene was supported by Britten (*Journ. Bot.* xxvi, 6 (1888)) who maintained that priority is "the only sound principle" in nomenclature. As for our own position, we follow the international rules promulgated at the botanical congress at Vienna in 1905 and at Brussels in 1910; and we have determined therefore not to make any changes in the names of genera, which are based on mere priority (see *Journ. Bot.* lii, 196—201 (1914)). Briquet (*Prodr. Fl. Corse*, i (1910)) has shown that, according to the international rules, Smith's names—*Nuphar* and *Nymphaea*—are correct; and Rendle (*Journ. Bot.* xlix, 277 (1911)) has accepted Briquet's view.

There appears to have been a certain amount of personal antagonism between Smith and Goodenough (Bishop of Carlisle) on the one hand and Salisbury on the other. Greene and Britten refer to this; and Britten remarks that Goodenough

"came as near hating Salisbury as a bishop could well do." In any case, the personal element does not enter into the matter to-day; and Britten's argument that the restoration of Salisbury's names is a "tardy act of reparation" involves an outlook on botanical nomenclature which fortunately has few sympathisers.

Some American botanists take up another position. The species which comes first in the original arrangement of the genus is regarded by them as "the type of the genus," and as determining the allocation of the name should the genus be subdivided into two or more genera by later botanists. Hence, on their view (see Miller and Standley *North Amer. Species of Nymphaea*[1], 65 (1912)), as the first Linnaean species of *Nymphaea* is *N. lutea*, the name *Nymphaea* should be retained for the yellow water-lilies. This plan seems to us as arbitrary and as unreasonable as it would be to regard the first building, perhaps a prison or perhaps a stable, encountered on entering a village as the type-building of that village.

Between the publication of Salisbury's names and those of Smith, Richard (*loc. cit.*) published the name of *Nymphozanthus* for the yellow water-lilies; but the name appears not to have been adopted by any other botanist.

Bubani (*loc. cit.*) proposed *Nymphona* as substitute for *Nuphar* on pedagogical grounds: it appears that the ancients restricted the word *nuphar* to the root of the plant.

About 7—8 (Engler) or about 24[2] species; extra-tropical northern hemisphere.

### British species of *Nuphar*

1. **Nuphar lutea** (see below). *Flowers* about 6—7 cm. in diameter. *Anthers* about 4 times as long as broad. *Stigmas* about 15—20.

2. **Nuphar pumila** (p. 98). *Flowers* about 4 cm. in diameter. *Anthers* not more than twice as long as broad. *Stigmas* about 8—12.

## 1. NUPHAR LUTEA. Yellow Water-lily. Plate 92

*Nymphaea lutea* Gerard *Herball* 672 (1597); Ray *Syn.* ed. 3, 368 (1724).

**Nuphar lutea** Sibthorp and Smith *Fl. Graec. Prodr.* i, 361 (1808 or 1809); Smith *Eng. Fl.* iii, 15 (1825); Rouy et Foucaud *Fl. France* i, 149 (1893); *Nymphaea lutea* L. *Sp. Pl.* 510 (1793); Smith *Eng. Bot.* no. 159 (1793); *Fl. Brit.* 569 (1800); *Nymphaea umbilicus* Salisbury *op. cit.* 71 (1806); *Nuphar lutea* var. *major* Syme *Eng. Bot.* i, 78 (1863).

Icones:—Smith *Eng. Bot.* t. 159, as *Nymphaea lutea*; Graves and Hooker in Curtis's *Fl. Lond.* ed. 2, t. 141; *Fl. Dan.* t. 603, as *Nymphaea lutea*; *Svensk Bot.* t. 266, as *Nymphaea lutea*; Reichenbach *Icon.* vii, t. 63, fig. 113.

*Camb. Brit. Fl.* iii. *Plate 92.* (*a*) Leaves. (*b*) Flower. (*c*) Stigmatic disc. (*d*) Stigmatic disc from a different plant. (*e*) Fruit. (*f*) Transverse section of fruit. (*g*) Seeds. *c* from Cambridgeshire (C. E. M.). Other plant from Huntingdonshire (E. W. H.).

Exsiccata:—Billot, 2007; *Herb. Fl. Ingric.* vi, 32.

Perennial. *Rhizome* stout. *Shoot* glabrous. *Leaves* submerged or floating, with stout petioles; laminae of the submerged leaves larger (about 15—25 cm. in diameter) than the floating leaves (about 10—20 cm. in diameter), thinner than the floating leaves, crumpled, longer than their petioles; laminae of the floating leaves much shorter than their petioles, broadly elliptical, deeply cordate at the base, the basal lobes over-lapping or contiguous or slightly spreading, margin entire, apex rounded, coriaceous in texture. *Inflorescence* solitary. *Flowers* with the odour of brandy, about 5—7 cm. in diameter; June to August. *Outer perianth-segments* suborbicular, conniving, rather thick, greenish on the outside, yellowish on the inside. *Inner perianth-segments* deep yellow, oboval, about a third as long as the outer ones. *Anthers* about 4 times as long as broad. *Stigmas* about 15—22, the rays acute at each end, scarcely reaching the margin of the disc. *Margin of the stigmatic disc* entire or only faintly wavy. *Fruit* broadly bottle-shaped, about 6—7 cm. long, including the neck, and 4·5—5·0 broad.

(*β*) forma **submersa** comb. nov.; *N. lutea* var. *submersa* Rouy et Foucaud *Fl. France* i, 149 (1893).

This is the submerged state of the species: it is not uncommon in deep waters, especially in rivers; and it seldom flowers or fruits.

In still and in slowly moving waters, as in the almost still waters of lakes, ponds, and ditches, and in rivers with a slow current in summer, preferring water with a high mineral content; less common (in the Fen district) in still waters than *Nymphaea alba*; rather local but widespread throughout the lowlands of the British Isles as far northwards as the Hebrides and Ross-shire.

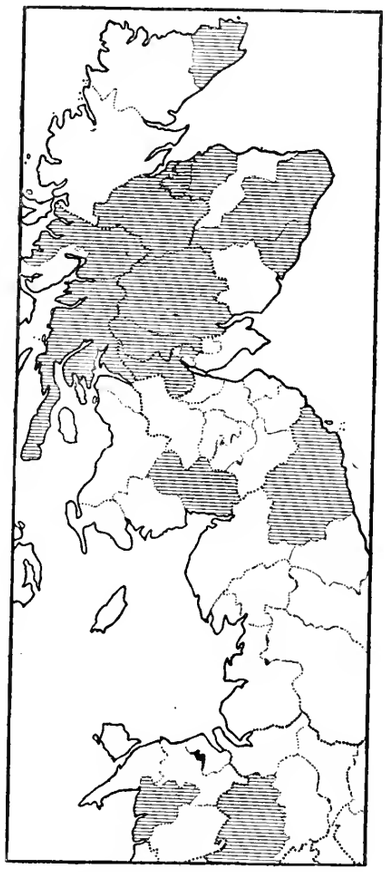
Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 530 m. in the Tyrol), Russia, southern Europe; Asia.

[1] *Contributions from the U.S. National Herbarium*, xvi, pt. 3; Washington.

[2] "Half-a-dozen forms have until recently been supposed to represent the specific differentiation of the American members of the group. Their number is now increased to nineteen" (Miller and Standley, *loc. cit.* (1912)).

## 2. NUPHAR PUMILA. Small Yellow Water-lily. Plates 93, 94

**Nuphar pumila** DC. *Syst. Nat.* ii, 61 (1825); Syme *Eng. Bot.* i, 80 (1863) incl. *N. lutea* var. *minor* p. 78; Rouy et Foucaud *Fl. France* i, 150 (1893); *Nymphaea pumila* Hoffmann *Deutschl. Fl.* 241 (1800); *Nymphaea lutea* var. *minima* Willdenow *Sp. Pl.* ii, 1151 (1800); *Nuphar minima* Smith *Eng. Bot.* no. 2292 (1811); *Nuphar minor* Dumortier *Fl. Belg.* 131 (1827); *N. rivulare* Dumortier in *Bull. Soc. Roy. Bot. Belg.* iii, 5 (1864).



Map 38. Distribution of *Nuphar pumila* in Great Britain

Icones :—Reichenbach *Icon. Crit.* t. 119.

Closely allied to *N. lutea*, but smaller in all its parts. *Laminae* about 6·0—7·5 cm. broad and 7—11 long, basal lobes not overlapping. *Flowers* about 3—4 cm. in diameter; June to August. *Outer perianthal segments* oval. *Inner perianthal segments* suborbicular. *Anthers* about twice as long as broad. *Stigmas* about 8—12. *Margin of the stigmatic disc* more or less lobed or toothed. *Fruit* narrowly bottle-shaped, about 4·0—4·5 cm. long and 2·0—2·5 broad.

(*a*) **N. pumila** var. **intermedia** comb. nov.; *N. minima* Spenner in *Flora* x, part 1, 113, t. 1 et t. 2 (1827); *N. lutea* var. *intermedia* Ascherson *Fl. Brandenb.* ii, 26 (1864); *N. lutea* var. *minor* Syme *Eng. Bot.* i, 78 (1863); *N. lutea* × *pumila* Caspary *Nuph. Voges.* in *Abh. Natur. Gesellsch. zu Halle* xi, 187 (1870); *N. pumila* var. *spenneriana* Rouy et Foucaud *Fl. France* i, 150 (1893).

Icones :—Syme *Eng. Bot.* i, t. 55, as *N. lutea* var. *minor*.

*Camb. Brit. Fl.* iii. *Plate 93.* (*a*) Leaf. (*b*) Flower. (*c*) Ovary. (*d*) Stigmatic disc. Northumberland (S. H. B.).

Exsiccata :—Billot, 313, as *N. pumila*; Fries, xiv, 24, as *N. intermedia*; Wirtgen, xvi, 876, as *N. spenneriana*.

*Margin of stigmatic disc* less deeply lobed than in var. *genuina*. *Stigmas* about 10—12.

Chartner's Loch, Northumberland, and perhaps elsewhere.

Scandinavia, Germany, France, central Europe, Russia.

(*b*) **N. pumila** var. **genuina** nobis; *N. pumila* var. *pumila* Rouy et Foucaud *Fl. France* i, 150 (1893).

Icones :—Smith *Eng. Bot.* t. 2292, as *N. minima*; Graves and Hooker in Curtis's *Fl. Lond.* ed. 2, t. 165, as *N. pumila*.

*Camb. Brit. Fl.* iii. *Plate 94.* (*a*) Leaves. (*b, c, d*) Flowers. (*e*) Stigmatic disc. (*f*) Fruit. (*g*) Transverse section of fruit. Shropshire (F. G. E.).

Exsiccata :—Fries, v, 21, as *N. pumila*; Reichenbach, 1107, as *N. pumila*.

*Margin of the stigmatic disc* rather deeply lobed. *Stigmas* about 8.

This appears to be the common form of the species in the British Islands.

In still or slowly moving waters, apparently preferring those with a low mineral-content; Shropshire and Northumberland in England, Merionethshire in Wales, and from Dumfriess-shire and central Scotland northwards to Caithness-shire; not recorded for Ireland.

Scandinavia, Denmark, Germany, Belgium, France, central Europe, Russia; Asia.

## Genus 2. Nymphaea

**Nymphaea** [Tournefort *Inst.* 260 (1700) partim;] L. *Sp. Pl.* 510 (1753) et *Gen. Pl.* ed. 5, 227 (1754) partim; Sibthorp et Smith *Prodr. Fl. Graec.* i, 360 (1808 or 1809); Caspary in Engler und Prantl *Pflanzenfam.* iii, pt. ii, 7 (1891); *Castalia* Salisbury in *Ann. Bot.* ii, 71 (1806).

Perennial, glabrous aquatic herbs with floating laminae. *Petioles* long, springing from the rhizome. *Laminae* of the floating leaves larger than those of the submerged leaves. *Sepals* usually 4, rarely 3 (in *N. odorata*), spreading, oblong, greenish on the outside, white or reddish or blue on the inside. *Petals* ∞, imbricate, spreading, gradually passing into staminodes and stamens, arising on the fused wall of the receptacle and ovary. *Stamens* acyclic, ∞, arising like the petals; filaments petaloid. *Ovary* subinferior, subglobose. *Nectary* globose, in the centre of the stigma. *Ovules* pen-

dulous, perisperm copious, endosperm scanty. *Fruit* with as many loculi as there are stigmas, covered on the outside with the fallen scars of the petals and stamens, ripening below the surface of the water, mucilaginous, dehiscing irregularly. *Seeds* ∞ in each loculus, subglobose, with an aril.

The British species belongs to the section *Castalia* DC. *Syst. Nat.* ii, 55 (1821), characterised by cordate, glabrous, entire *laminae*, by white *perianth-segments*, and by *anthers* whose apex is not produced.

About 78 species; cosmopolitan.

British species of *Nymphaea*

1. **N. alba** (see below). *Floating laminae* large (often 20—25 cm. long), veins of the basal lobes not converging if produced. *Flowers* about 10—14 cm. in diameter. *Fruit* subglobose, about 2·0 to 2·5 cm. in diameter, staminal scars all over it.

2. **N. occidentalis** (see below). *Floating lamina* about 9—12 cm. broad and 11—13 long, veins of the lobes converging if produced. *Flowers* about 7 cm. in diameter. *Fruit* depressed-subglobose (5 : 7), staminal scars absent towards the top.

## 1. NYMPHAEA ALBA. White Water-lily. Plate 95

*N. alba* Gerard *Herball* 672 (1597); Ray *Syn.* ed. 3, 368 (1724).

**Nymphaea alba** L. *Sp. Pl.* 510 (1753); Smith *Eng. Bot.* no. 160 (1793); *Fl. Brit.* 570 (1800); Syme *Eng. Bot.* i, 76 (1863) excl. var. *minor*; Rouy et Foucaud *Fl. France* i, 151 (1893) partim; *Castalia speciosa* Salisbury *op. cit.* 72 (1806); *C. alba* Wood in Rees' *Cyclop.* vi (1806).

Icones :—Smith *Eng. Bot.* t. 160; Hooker in Curtis's *Fl. Lond.* ed. 2, t. 140; *Fl. Dan.* t. 602; *Svensk Bot.* t. 92; Reichenbach *Icon.* vii, 67, fig. 117.

*Camb. Brit. Fl.* iii. *Plate 95.* (*a*) Leaf. (*b*, *c*) Flowers. (*d*, *e*) Fruits. (*f*) Stigmatic disc. (*g*) Transverse section of fruit. (*h*, *i*) Longitudinal sections of fruit. *e*, *h*, *i* from Cambridgeshire (C. E. M.). Other plant from Huntingdonshire (J. H. H.).

Exsiccata :—Billot, 2006; v. Hayek, 963, as *Castalia alba*; Reichenbach, 1608; *Herb. Fl. Ingric.* viii, 31.

Perennial. *Rhizome* stout, horizontal. *Petioles* very long. *Submerged leaves* petioled, the laminae orbicular, smaller than the floating leaves. *Floating leaves* long-petioled, large (often 20—25 cm. long), suborbicular, deeply cordate at the base, coriaceous. *Flowers* 10—14 cm. in diameter, the largest in the British flora; June to September. *Perianth-segments* white, spreading, sepals and petals not well defined, gradually passing into stamens, outer ones greenish brown on the outside. *Fruit* subglobose, slimy, about 2·0—2·5 cm. in diameter.

Common in rivers, broads, meres, ponds, and ditches in the fens of eastern England where it is indigenous; recorded throughout the British Islands, but often introduced; commoner in still waters than *Nuphar lutea* and preferring waters with a high mineral-content.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; northern Africa; south-western Asia.

## 2. NYMPHAEA OCCIDENTALIS. Small White Water-lily. Plate 96

*N. alba minor* Gerard *Herball* 672 (1597).

**Nymphaea occidentalis** nobis; *N. alba* var. *minor* [DC. *Syst. Veg.* ii, 56 (1821)?; Dumortier *Fl. Belg.* 131 (1827) nomen;] Syme *Eng. Bot.* i, 76 (1863); *Castalia candida* Druce in *New Phytol.* x, 306 (1911) non aliorum; *C. alba* var. *candida* Druce *op. cit.* 324 (1911) non aliorum; *N. alba* var. *occidentalis* Ostenfeld in *New Phyt.* xi, 116, fig. B (1912).

Icones :—*Camb. Brit. Fl.* iii. *Plate 96.* (*a*, *b*) Leaves seen from above. (*c*) Leaf seen from below. (*d*) Flower. (*e*) Stamens. (*f*) Mature fruit. (*g*) Immature fruit. (*h*, *i*) Longitudinal section of mature and immature fruits. *c* from Perthshire (C. E. M.). Other plant from Eastern Inverness-shire (R. S. A.).

Exsiccata :—Herb. Marshall, 2508, 3462.

Closely allied to *N. alba* (and also to the non-British species *N. candida*), but differing in the following characters :—Plant smaller. *Laminae* orbicular, 9—12 cm. broad and 11—13 long, with the veins of the lobes converging if produced. *Receptacle* subangular at the point of insertion. *Flowers* up to about 7 cm. in diameter; June to September. *Pollen-grains* papillose. *Stigmatic* rays yellow. *Fruit* depressed-subglobose (5 : 7), without staminal scars towards the top. *Seeds* about 3·0—3·5 mm. in diameter.

When the fruit is beginning to ripen, it is still small and angled by the scars of the fallen petals. When quite ripe and ready to burst, the fruit is inflated and hence larger; and the pericarp is so stretched that the scars of the petals cease to

make angles on the rotund fruit. Eventually the fruits burst. All these happenings take place under water; and we have to thank Mr Hunnybun for drawing our attention to them. The circumstances explain the varied descriptions and illustrations of fruits of *Nymphaea*.

Although this plant has long been known to British botanists, it was Ostenfeld (*loc. cit.*) who first made clear its relationships with *N. alba* and the non-British *N. candida*. We were present on the occasion when Ostenfeld saw the present plant in Perthshire. At the moment, he suggested it might possibly be *N. candida*; but he cautiously added that he would take material with him back to Copenhagen, and examine it critically at his leisure. In the meantime, Druce recorded the plant as *N. candida*. Ostenfeld's examination of his Perthshire specimens convinced him it was not *N. candida*; and he named it *N. alba* var. *occidentalis*. The plant is certainly *N. alba* var. *minor* of Syme, and perhaps that of de Candolle; but Ostenfeld, being uncertain of the latter point, chose to give it a new name. Ostenfeld informs us (*in litt.*) that he thinks there are probably several small water-lilies in Europe. This may well be the case; but all the west-European material we have seen can be fairly ascribed to our species *N. occidentalis*.

In still or slowly moving waters with a low mineral-content, especially in heathy and moorland districts; very rare in England and only recorded for Hampshire; locally abundant in Wales, Scotland (northwards to Zetland), and western Ireland; ascending to 425 m. in Perthshire.

Scandinavia, Germany, Holland, Belgium, France, central Europe, Sicily. It is possible that in some of these countries there is confusion between *N. occidentalis* (which appears to be a west-European species) and *N. candida* (which is on the whole an east-European species).

## Family 2. CERATOPHYLLACEAE

**Ceratophyllaceae** Asa Gray in *Ann. Lyc. Nat. Hist. New York* iv, 41 (1848); Engler *Pflanzenfam.* iii, pt. 2, 10 (1891); *Ceratophylleae* S. F. Gray *Nat. Arr.* ii, 395 et 554 (1821); Schleiden in *Linnaea* xi, 513 (1837).

Perennial, aquatic herbs. *Leaves* whorled. *Inflorescence* solitary, axillary, sessile or nearly so. *Flowers* acyclic, diclinous, small. *Receptacle* convex or flat. *Perianth* monochlamydeous, hypogynous, sepaloid, with about 6—12 persistent segments. *Stamens* 5—25. *Ovary* of 1 carpel, hypogynous. *Ovule* 1, orthotropous, pendulous. *Fruit* an achene. *Seed* with little endosperm. *Integument* 1, membranous. *Radicle* absent or very short. *Cotyledons* 2, bifid, thick, oval. *Plumule* large, with several nodes and leaves.

Only genus:—*Ceratophyllum*.

## Genus 1. Ceratophyllum

**Ceratophyllum** L. [*Gen. Pl.* 290 (1737);] *Sp. Pl.* 992 (1753) et *Gen. Pl.* ed. 5, 428 (1754); Gaertner *Fruct.* i, 212, t. 44 (1788); Engler in *Pflanzenfam.* iii, pt. 2, 12 (1891). [*Dichatophyllon* Dillenius *App. Cat. Giss.* 91 (1719).]

Perennial, aquatic, submerged, rootless herbs; land-forms unknown. *Stem* cylindrical, fragile, branched, decaying behind as the branches grow at the apex. *Leaves* exstipulate, whorled, compound, segments linear to subulate and usually forked, the older ones thickened, 6—12 in a whorl. *Winter-buds* not formed, the whole plant sinking to the bottom of the water in autumn and rising again in spring. *Perianth* almost to quite polyphyllous. *Staminate flowers* larger than the pistillate ones, with about 12 segments; *filaments* very short, connective prolonged above the anther and usually 2-fid or 3-fid; *anthers* extrorse, broadly elliptical, erect, stout, as long as or rather longer than the perianth, dehiscing by a lateral pore, rising to the surface before dehiscence; *pollen-grains* flattened on one side. *Pistillate flowers* much smaller than the staminate ones; *perianth-segments* fewer than in the staminate flowers, polyphyllous; *ovary* free from the rest of the flower; *stigmas* 1—3, subfalcate; if 1, lateral; *ovary* sessile. *Achene* black or nearly so.

There has been much difference of opinion regarding the affinities of *Ceratophyllum*. Many botanists (e.g., Linnaeus, Jussieu, S. F. Gray, and de Candolle) placed the genus near *Myriophyllum*, being impressed by the resemblance in habit. Bentham and Hooker regarded the genus as anomalous. Asa Gray (*loc. cit.*) cites Brongniart (cf. *Ann. Sci. Nat.* xii (1827)) as relating the genus to the *Nymphaeaceae*, near which *Ceratophyllum* is placed by Warming (*Handb. Syst. Bot.*, English translation by Potter, 388 (1895)); and this view received great support from Strasburger (in *Jahr. Wiss. Bot.* xxxvii, 477—526 (1902)). The genus is now usually placed in the *Ranunculales*, near *Nymphaeaceae*; and this seems to be its correct position, judging by its monochlamydeous perianth with numerous segments, its stamens unfixed in number but usually rather numerous, its solitary ovule free from the other parts of the flower, as well as its curious embryo. *Ceratophyllum* is probably an ancient genus, long ago specialised in relation to its completely aquatic mode of life, and now decadent.

Asa Gray (*loc. cit.*) attributes rather *bizarre* views to L. C. Richard and to de Jussieu. Richard is stated to have referred *Ceratophyllum* to the *Coniferae*; but this is an exaggeration (see Richard *Anal. Fruit* 93 (1808)). All that Richard actually did was to point out that he [erroneously] considered the embryo of *Ceratophyllum* to have four cotyledons, and adds:—"L'ordre des Conifères est celui dans lequel on trouve le plus d'exemples de l'Embryon polycotylédoné." Similarly

the statement that de Jussieu referred *Ceratophyllum* to the *Monocotyledones* is scarcely correct: he refers them (*Gen. Pl.* 18 (1789)) to his "order" *Naïades*, a heterogeneous group containing, among other genera, *Hippuris* and *Myriophyllum*; and the "order" is placed in his *Acotyledones*, and not in his *Monocotyledones*.

A good account of the genus is to be found in von Martius' *Fl. Brasil.* vol. iii, pt. iii (1894).

About 3—6 species; cosmopolitan.

British species of *Ceratophyllum*

1. **C. submersum** (see below). *Leaves* smoother, longer, less rigid, more divided, and less tufted at the ends of the branches than in *C. demersum*. *Style* shorter. *Achene* with a shorter terminal spine and no lateral spines.

2. **C. demersum** (see below). *Leaves* rougher, shorter, stiffer, less divided, and usually more tufted at the ends of the branches than in *C. submersum*. *Style* longer. *Achene* with a longer terminal spine, often with 2 (rarely more) lateral spines also.

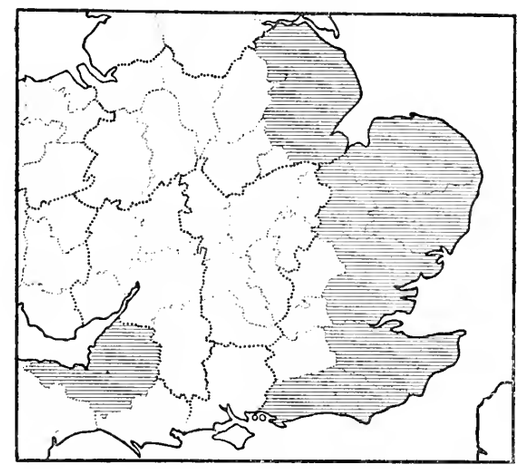
## 1. CERATOPHYLLUM SUBMERSUM. Hornwort. Plate 97

*Hydroceratophyllum folio laevi octo cornibus armato* Dillenius in Ray *Syn.* ed. 3, 135 (1724).

**Ceratophyllum submersum** L. *Sp. Pl.* ed. 2, 1409 (1763); Smith *Fl. Brit.* 1020 (1804) partim[1]; Nolte *Nov. Fl. Holsat.* 77 (1828); Rouy et Foucaud *Fl. France* xii, 280 (1912); *C. demersum* var. *β* L. *Sp. Pl.* 992 (1753); *C. muticum* Chamisso in *Linnaea* iv, 505 (1829); v, 336, t. 4, fig. A et B (1830); *C. vulgare* var. *muticum* Schleiden in *Linnaea* xi, 541, t. 11, fig. 16 (1837) partim[1]; *C. aquaticum* subsp. *submersum* Syme *Eng. Bot.* viii, 124 (1868); *C. demersum* var. *submersum* von Martius *Fl. Brasil.* iii, pt. 3, t. 125, fig. f (1894).

Icones:—*Camb. Brit. Fl.* iii. *Plate 97.* (*a*) Fertile shoot. (*b*) Leaf. (*c*) Ultimate lobe of leaf (enlarged). (*d*, *e*, *f*) Ripening fruits (enlarged). (*g*, *h*) Fruits (enlarged). Kent (M. W.).

Exsiccata:—Billot, 1192; Fries, ix, 63; Reichenbach, 1419; Schultz (*H. N.*), i, 49.



Map 39. Distribution of *C. submersum* in England

Closely allied to *C. demersum* var. *apiculatum*, but differing from that variety in the following characters:—*Shoot* paler green, less rough, less rigid, leaflets collapsing when taken out of the water. *Leaves* longer (up to about 5 cm.), smoother, divided into more numerous slender and longer lobes, lobes less markedly spinulose. *Flowers* July to September. *Stamens* often only 4—6. *Style* shorter. *Achene* smooth and whitish when young; when mature, often more or less covered with small acute and rather distant tubercles except on the slightly winged margins; terminal spine very short and merely mucronoid, lateral spines absent.

Local, in stagnant and brackish waters in southern and eastern England; Somerset, and from Sussex to Lincolnshire; locally abundant in the ditches bordering the estuary of the Thames in northern Kent. Records for central England and Scotland require verification, owing to confusion with *C. demersum* var. *apiculatum*, though it is quite possible the species has a wider distribution than we here allow. Not recorded for Wales or Ireland.

Recorded for Sweden, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; northern Africa; Asia. Doubtless some of these places only furnish *C. demersum* var. *apiculatum* (cf. p. 102).

## 2. CERATOPHYLLUM DEMERSUM. Hornwort. Plates 98, 99

*Millefolium aquaticum cornutum* Ray *Cat. Angl.* 210 (1670); *M. aquaticum equisetifolium seu aquaticum ramosum aquis immersum* Ray *Syn.* ed. 2, 280 (1696); *Hydroceratophyllum folio aspero quatuor cornibus armato* Ray *Syn.* ed. 3, 135 (1724).

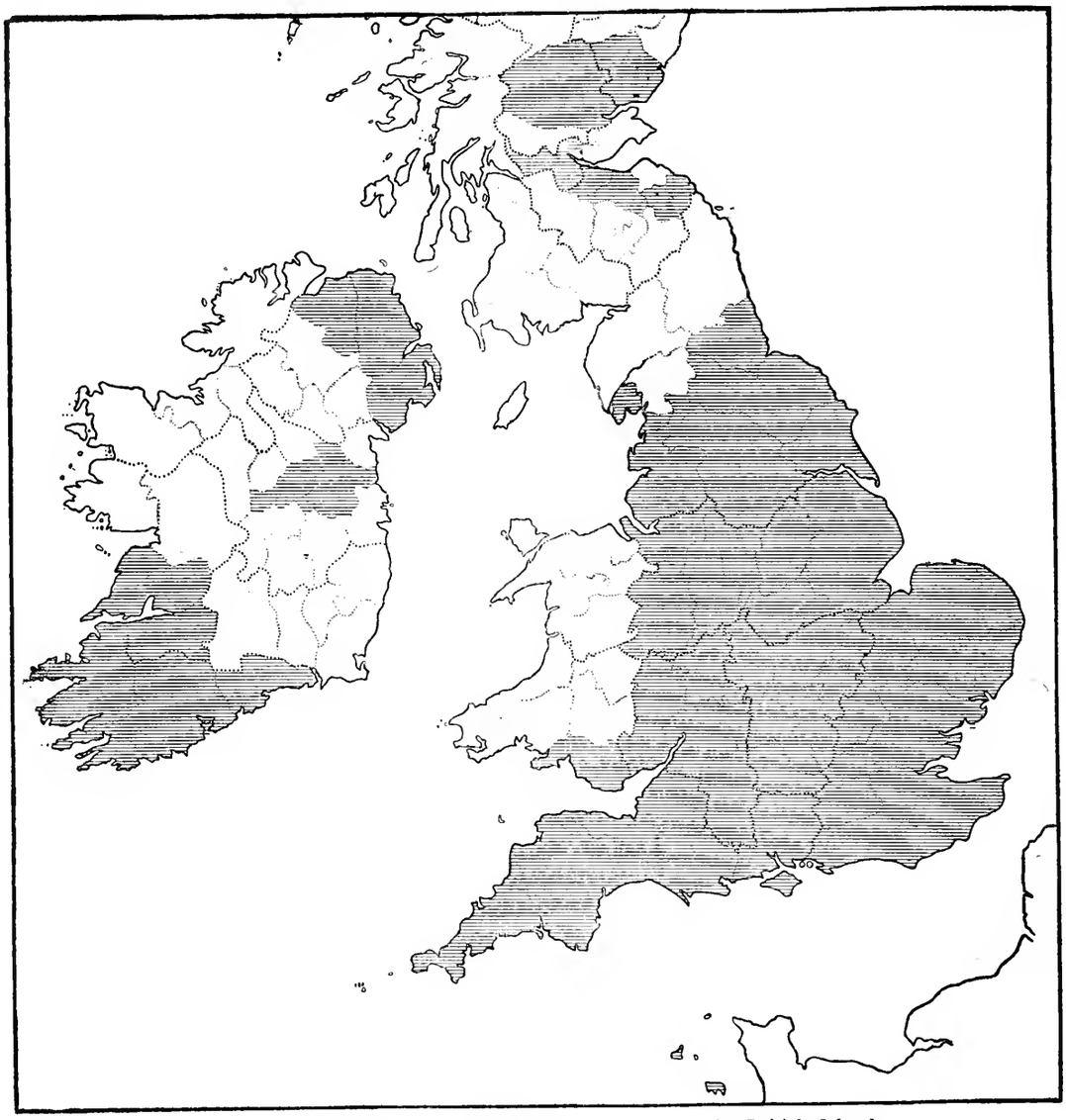
**Ceratophyllum demersum** L. *Sp. Pl.* 992 (1753) excl. var. *β*; ed. 2, 1409 (1763); Smith *Fl. Brit.* 1020 (1804); Rouy *Fl. France* xii, 281 (1910).

Icones:—Von Martius *Fl. Brasil.* t. 125, excl. fig. *f* (several varieties).

[1] Many botanists have confused under one name the two plants *C. submersum* and *C. demersum* var. *apiculatum*.

Exsiccata:—Billot, 3084; Fries ix, 64; Hansen, 1086; Welwitsch (*Fl. Lusit.*), 801; *Herb. Fl. Ingric.* vii, 236 B.

Perennial. *Stem* up to nearly 1 m. long, lower nodes about as long as the leaves. *Leaves* rather rough, rigid, not collapsing when taken out of the water, about 1·5—2·0 cm. long, about 8 in a whorl, branched, with 2 main segments, segments often more or less branched but less so than in *C. submersum*; lobes subulate, broader than in *C. submersum*, margin spinulose, spinules rather more marked than in *C. submersum*. *Flowers* appearing in early July. *Perianth of the staminate flowers* about 4 mm. long and broad, cup purplish; segments greenish and often dotted with purple, with 1—3 mucronations of various lengths at the tip. *Stamens* about 5—20, usually more numerous than in *C. submersum*, purplish. *Perianth of the pistillate flowers* about 1 mm. long and 2 high; segments scarcely joined, paler than in the staminate flower. *Stigmas* 1—3,



Map 40. Distribution of *Ceratophyllum demersum* in the British Islands

long, projecting much beyond the perianth; when 1, lateral. *Achene* ultimately black, with a terminal spine (the persistent remains of the stigma), sometimes with 2 lateral spines just below the apical one or with these subapical spines reduced to tubercles or absent, often with 2 lateral spines near the base, the sub-basal spines sometimes reduced to tubercles or quite absent, all the spines variable in length.

(*a*) **C. demersum** var. **apiculatum** Ascherson *Fl. Brandenb.* i, 219 (1864); *C. unicorne* Dumortier *Fl. Belg.* 165 (1827); *C. apiculatum* Chamisso in *Linnaea* iv, 505, t. 5, fig. 6 e (1829); *C. demersum* var. γ Hooker and Arnott *Brit. Fl.* ed. 6, 371 (1850); *C. demersum* var. *unicorne* Rouy *loc. cit.* (1910); *C. submersum* var. *apiculatum* Dalla Torre und Sarnthein *Farn- und Blutenpfl. Tirol* 222 (1909).

Icones:—Smith *Eng. Bot.* t. 679, as *C. submersum*; *Fl. Dan.* t. 510, as *C. submersum.*

*Camb. Brit. Fl.* iii. *Plate 98.* (*a, b*) Fertile shoots. (*c*) Leaf (enlarged). (*d*) Ultimate lobe of leaf (enlarged). (*e*) Very young fruits (one enlarged). (*f*) Young fruits (one enlarged). (*g*) Ripening fruits (one

enlarged). (*h*) Nearly ripe fruits (one enlarged). (*i*) Staminate flower (enlarged). (*j*) Sepals (enlarged). R. F. T. (Worcestershire).

*Shoot* of a rather paler green than in var. *oxyacanthum*. *Leaves* less rigid and leaflets of the lower leaves more divided than in var. *oxyacanthum*. *Stamens* often fewer than in var. *oxyacanthum*. *Achenes* with a short terminal spine and with the lateral spines absent or reduced to very small protuberances.

This var. *apiculatum* is frequently mistaken for *C. submersum*. Without doubt, the var. *apiculatum* is a connecting link between *C. submersum* and *C. demersum* var. *oxyacanthum*.

As shown in the above citations, Hooker and Arnott mentioned this var. *apiculatum* in 1850: they refer to "Mr Babington's notice of it"; but we have been unable to trace any account of the variety by Babington. Hooker and Arnott's record of the plant is unlocalised. Mr A. Fryer (in *Journ. Bot.* xxv, 282 (1887)) definitely records the plant for Huntingdonshire; and later (in *Bot. Exch. Club Brit. Is. Rep. for 1887*, i, 190 (1888)) he also records plants which are, in our opinion, hybrids between it and var. *oxyacanthum*. We think it possible that some of the varieties mentioned by Rouy (*loc. cit.*) are referable to hybrids of these two varieties. Mr R. F. Towndrow sent us fresh plants of var. *apiculatum* from Worcestershire, and Mr and Mrs Corstorphine from Forfarshire. We have also seen dried specimens from Kent and the East Riding of Yorkshire. We believe the plant will prove to be widespread.

Kent, Huntingdonshire, Worcestershire, East Riding of Yorkshire, Forfarshire, and doubtless elsewhere.

Denmark, Germany, Belgium, France, central Europe; Africa; America.

(*b*) **C. demersum** var. **oxyacanthum** von Martius *Fl. Brasil.* iii, pt. 3, 747 (1894); *C. tricorne* Dumortier *Fl. Belg.* 165 (1827) nomen, incl. *C. tricuspidatum*; *C. oxyacanthum* Chamisso in *Linnaea* iv, 504, t. 5, fig. 6 b (1829); *C. vulgare* var. *oxyacanthum* Schleiden in *Linnaea* xi, 541, t. 11, fig. 15 (1837); *C. demersum* var. *α* Hooker and Arnott *Brit. Fl.* ed. 6, 371 (1850); *C. aquaticum* subsp. *demersum* Syme *Eng. Bot.* viii, 123 (1868).

Icones:—Smith *Eng. Bot.* t. 947, as *C. demersum*; *Fl. Dan.* t. 2000, as *C. demersum*; Baxter *Phaen. Bot.* t. 260, as *C. demersum*.

*Camb. Brit. Fl.* iii. *Plate 99.* (*a*) Barren shoot. (*b*) Fertile shoot. (*c*) Leaf. (*d*) Leaf (enlarged). (*e*) Ripening fruits (one enlarged). Cambridgeshire (A. S. S.). (*f*) Ripening fruits (one enlarged). (*g*) Fruits (one enlarged). Worcestershire (R. F. T.).

*Leaves* crowded (especially at the apex of the branches), rough to the feel, rigid, dark green. *Fruit* more or less tuberculate or muricate, with a terminal spine and two lateral spines, the latter directed downwards and inserted near the base of the achene.

Cambridgeshire, Worcestershire, and doubtless elsewhere.

Europe; Asia; Africa; America.

[(*c*) **C. demersum** var. **platyacanthum** Wimmer *Fl. Schles.* ed. 3, 169 (1857); *C. platyacanthum* Chamisso in *Linnaea* iv, 504, t. 5, fig. 6 a (1829); Godron in Grenier et Godron *Fl. France* i, 593 (1848); Ascherson und Graebner *Fl. Nordostd. Flachl.* 320 (1898); *C. vulgare* var. *platyacanthum* Schleiden in *Linnaea* xi, 540, t. 11, fig. 14 (1837); *C. demersum* var. *β* Hooker and Arnott *Brit. Fl.* ed. 6, 371 (1850); *C. demersum* subsp. *platyacanthum* Rouy *Fl. France* xii, 281 (1910).

*Mature fruit* winged, 3-spined, spines longer than in var. *oxyacanthum*, the lateral spines issuing from a higher level than in var. *oxyacanthum*, with irregular teeth between the spines.

As in the case of var. *apiculatum*, this var. *platyacanthum* is mentioned in Hooker and Arnott's *British Flora* (*loc. cit.*), but not localised. The record appears to have been copied in several continental floras, and to have been dropped by British botanists. We have seen no British examples.

Germany (apparently common in some parts), France (apparently rare), central Europe, southern Russia.]

Local, in slowly moving waters with a high or comparatively high mineral content; from the Channel Isles, Cornwall, and Kent, northwards to Perthshire and Forfarshire; local in Ireland; rare in Wales, as in hilly districts generally.

Faeröes, Iceland, Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; Africa; Asia; America.

## Family 3. **RANUNCULACEAE**

**Ranunculaceae** Jussieu *Gen. Plant.* 231 (1789) emend.; DC. *Syst. Nat.* i, 125 et 127 (1818) emend., excl. *Ranunculaceae spuriae*; Prantl in *Pflanzenfam.* iii, pt. 2, 43 (1891) emend.

Usually herbaceous perennials with root-tubers or rhizomes, sometimes annual, rarely lianes; usually acrid or poisonous. *Leaves* often all radical; stem-leaves usually alternate, rarely opposite; petioles usually present, often long, usually more or less dilated or sheathing (*quasi*-stipulate) at the base; laminae simple or compound. *Inflorescence* usually cymose, rarely solitary. *Bracts* usually leaf-

like, often involucrate, sometimes petaloid. *Thalamus* or *receptacle* more or less elongate, holding all the parts of the flower. *Flowers* monoclinous, usually protandrous, usually actinomorphic, primitively monochlamydeous, sometimes heterochlamydeous (as in *Ranunculinae*, owing to the petaloid development of the nectiferous staminodes or owing to the bracts becoming sepaloid or even petaloid), the parts often spirally arranged. *Disc* absent. *Sepals* free, usually more or less petaloid. *Staminodes* or *nectar-leaves* or *petals* absent in the less specialised forms (e.g., *Caltha* and *Clematis*), when present usually tubular and often more or less bilabiate, one of the lips becoming broad and petal-like in *Ranunculus*, hypogynous. *Stamens* 5—∞, usually ∞, often spirally arranged, hypogynous and free; anthers extrorse. *Carpels* ∞—1, usually ∞, often spirally arranged, usually free, superior. *Ovules* ∞—1 in each carpellary loculus, anatropous. *Placentation* basal or sutural. *Style* short or absent, often more or less persistent and forming the beaks to the fruits. *Fruit* a group of follicles or achenes, rarely a more or less syncarpous capsule as in *Helleborus* spp. and *Nigella*. *Endosperm* copious, oily. *Embryo* minute. *Integuments* 1—2.

The nectar-secreting organs so common in this family, placed between the calyx and the androecium, are sterilised stamens. In development, they are often formed in the same series as the stamens: they occupy the position of stamens and do not alternate with the sepals; and when more than ordinarily numerous the increased number is at the expense of the stamens, as their position shows. They are often more or less bilabiate; and in *Ranunculus*, the outer lip has become very large and very broad; and the organs may then be reasonably called petals. They should be compared with the same organs in *Berberidaceae*. In our opinion, the corolla, both in the higher *Centrospermae* and *Heterochlamydeae*, is of androecial origin. The calyx, on the other hand, we regard as of bracteal and hence of obviously foliar origin.

About 1200 species; cosmopolitan.

### Tribes of *Ranunculaceae*

Tribe I. **Helleboreae** (see below). *Fruit* a follicle. *Seeds* several in each follicle, usually biseriate, uniseriate in *Eranthis*.

Tribe II. **Anemoneae** (p. 113). *Fruit* an achene. *Seeds*—1 functional seed in each achene, sometimes with additional vestigial ones.

## Tribe I. *HELLEBOREAE*

**Helleboreae** DC. *Syst. Nat.* i, 130 et 306 (1818).

For characters, see above.

### Subtribes of *Helleboreae*

Subtribe I. **Calthinae** (see below). *Laminae* simple, palmately nerved. *Flowers* acyclic, actinomorphic or nearly so. *Sepals* usually 5, deciduous. *Nectar-leaves* or *petals* absent. *Carpels* 5—10, sessile, free, provided with nectaries.

Subtribe II. **Helleborinae** (p. 106). *Laminae* compound, palmately or digitately divided. *Flowers* acyclic, actinomorphic or nearly so. *Nectar-leaves* or *petals* present, green or yellow, not spurred. *Carpels* 10—2, sessile, free or joined a little at the base.

Subtribe III. **Aquilegiinae** (p. 110). *Laminae* compound, 2—3 times ternate. *Flowers* cyclic, actinomorphic. *Nectar-leaves* or *petals* present, petaloid, produced backwards into a hollow spur. *Inner stamens* sterile. *Carpels* 5—1, free or united at the base, sessile.

Subtribe IV. ***Delphiniinae** (p. 111). *Laminae* compound. *Flowers* cyclic, zygomorphic. *Nectar-leaves* or *petals* present, 2 only functional. *Carpels* 5—1, free, sessile.

## Subtribe I. *CALTHINAE*

**Calthinae** nobis.

For characters, see above. Only genus:—*Caltha*.

## Genus 1. Caltha

**Caltha** L. [*Gen. Pl.* 165 (1737)] *Sp. Pl.* 558 (1753) et *Gen. Pl.* ed. 5, 244 (1754); Prantl in *Pflanzenfam.* iii, pt. 2, 55 et 56 (1891). [*Populago* Tournefort *Inst.* 273, t. 145 (1700).]

Perennial herbs. *Leaves* petioled; *laminae* simple, more or less cordate at the base. *Flowers* monochlamydeous. *Sepals* petaloid, deep yellow, deciduous, usually 5, subequal in size. *Stamens* ∞. *Follicles* 3—10. *Seeds* several in each follicle, oblong, testa hard and smooth, chalaza and raphe conspicuous.

About 16 species; cosmopolitan.

## 1. CALTHA PALUSTRIS. Marsh Marigold. Plates 100, 101, 102, 103

*C. palustris major* Gerard *Herball* 670 (1597) incl. *C. palustris minor*; *C. palustris vulgaris simplex* Parkinson *Theatr. Bot.* 1213 (1640) incl. *C. flore pleno*; *Populago* Ray *Syn.* ed. 3, 272 (1724).

**Caltha palustris** L. *Sp. Pl.* 558 (1753)!; Smith *Eng. Bot.* no. 506 (1798)!; *Fl. Brit.* 599 (1800); Syme *Eng. Bot.* i, 50 (1863); Rouy et Foucaud *Fl. France* i, 113 (1893); *C. major* Miller *Gard. Dict.* ed. 8, no. 1 (1768) incl. *C. minor* no. 2.

Perennial geophyte. *Stem* hollow. *Leaves* simple, petioled; petioles long, stipuloid at the base; laminae cordiform or reniform, more or less cordate at the base, margin serrate or crenate, apex very obtuse. *Inflorescence* few-flowered, cymose. *Peduncles* hollow. *Pedicels* strongly grooved, hollow. *Flowers* from about 1—6 cm. in diameter; March to May and sometimes a second crop in autumn. *Perianth* petaloid, greenish outside, deep yellow inside, segments 5—6. *Stamens* ∞. *Carpels* ∞, sessile, free. *Follicles* usually more or less arched or falcate. *Seeds* in 2 rows, ∞; testa hard; chalaza and raphe conspicuous.

(*a*) **C. palustris** var. **vulgaris** Rouy et Foucaud *op. cit.*, emend.; *C. major* Miller *Gard. Dict.* ed. 8, no. 1 (1768) incl. *C. minor* no. 2; *C. palustris* var. *major* DC. *Syst. Nat.* i, 308 (1818) incl. var. *minor* p. 309; *C. palustris* subsp. *eu-palustris* var. *vulgaris* Syme *Eng. Bot.* i, 50 (1863) incl. var. *minor* p. 51.

Icones:—Smith *Eng. Bot.* t. 506, as *C. palustris*; Curtis *Fl. Lond.*, t. i, 114, as *C. palustris*; *Fl. Dan.* t. 668, as *C. palustris*; *Svensk Bot.* t. 200, as *C. palustris*; Reichenbach *Icon.* iv, t. 101, fig. 4712, as *C. palustris.*

*Camb. Brit. Fl.* iii. *Plate 100.* (*a, b*) Lower leaves. (*c*) Flowering branch. (*d*) Head of follicles. (*e*) Follicle. Huntingdonshire (E. W. H.). [*Camb. Brit. Fl.* iii. *Plate 101.* (*a, b, c, d*) Lower leaves. (*e, f*) Flowering branches. (*g*) Fruiting branch. Hort., origin Perthshire (E. S. M.).]

Exsiccata:—Billot, 2, as *C. palustris*; *Herb. Fl. Ingric.* i, 20, as *C. palustris.*

*Radical leaves* cordate at the base, basal angle rather narrow. *Stem* not rooting at the nodes. *Flowers* often large (up to about 6 cm. in diameter). *Petals* usually overlapping at the base. *Carpels* somewhat arched.

(*β*) var. **vulgaris** forma **minor** comb. nov.; *C. minor* Miller *Gard. Dict.* ed. 8, no. 2 (1768); *C. palustris* var. *minor* DC. *Syst. Nat.* i, 309 (1818); Rouy et Foucaud *Fl. France* i, 114 (1893); *C. palustris* subsp. *eu-palustris* var. *minor* Syme *Eng. Bot.* i, 51 (1863).

This is the small state often met with at the higher altitudes (up to 910 m.) on mountains. An example of such a plant, only 2·5 cm. across, was sent to Mr Hunnybun to draw: before drawing it, he cultivated it in his garden for two years when the plant had grown almost to normal dimensions, as seen on Plate 101.

(*b*) **C. palustris** var. **radicans** Huth in *Helios Abh. u. Monat. Mitth. Naturw.* ix, 70 (1892); *C. radicans* Forster in *Trans. Linn. Soc.* viii, 324, t. 17 (1807); Smith *Eng. Bot.* no. 2175 (1910); *C. palustris* subsp. *radicans* Syme *Eng. Bot.* i, 52 (1863); *C. palustris* var. *zetlandica* Beeby in *Scott. Nat.* 21 (1887).

Icones:—Smith *Eng. Bot.* t. 2175, as *C. radicans.*

*Camb. Brit. Fl.* iii. *Plate 102.* (*a*) Flowering branch. (*b*) Fruiting branch. Perthshire (E. S. M.).

*Branches* rooting at the nodes. *Laminae* often with basal lobes widely spreading. *Flowers* rather small (1·5—2·5 cm. in diameter). *Carpels* as in var. *vulgaris.*

The form named var. *zetlandica* by Beeby (*loc. cit.*), and figured in the present work (Plate 102), is intermediate in leaf-shape between var. *vulgaris* and the original *C. radicans* of Forster (*loc. cit.*). In a note on Mr Hunnybun's original drawing, the Rev. E. S. Marshall states that "even on the same individual there is often much variation in the shape of the leaves" of the var. *radicans.*

Smith (*loc. cit.*) kept this variety as a species and Syme (*loc. cit.*) as a subspecies[1]; but neither author gives any character of the flower or fruit or seed which serves to distinguish the plant from all the other forms of this polymorphic and responsive species. The variety *radicans* has a distinct appearance on account of its procumbent and rooting stem; and it is exactly what those field botanists who determine "species" at sight and principally by habit are fond of calling "a very distinct species." Until the point of view of such field-botanists is understood, their too confident phraseology is very apt to be misleading.

Margins of lakes and rivulets in Wales (e.g., Carnarvonshire) and Scotland, from Edinburghshire to Zetland; ascending to 910 m. in Perthshire.

Faeröes; North America, and doubtless elsewhere.

(*c*) **C. palustris** var. **guerangeri** Lamotte *Prodr. Fl. Plat. Centr. France* i, 53 (1877); Rouy et Foucaud *Fl. France* i, 114 (1893); *C. guerangeri* Boreau in Billot's *Annot.* 11 (1855); *C. palustris* subsp. *eu-palustris* var. *guerangeri* Syme *Eng. Bot.* i, 50 (1863).

[1] Syme's subspecies are virtually equivalent to our varieties, and his varieties to our subvarieties and *formae.*

Icones :—*Camb. Brit. Fl.* iii. *Plate 103.* (*a*, *b*) Lower leaves. (*c*) Flowering branch. (*d*) Flower. (*e*) Fruiting branch, with young fruit. (*f*) Head of follicles. Huntingdonshire (E. W. H.).

*Habit* of var. *vulgaris*. *Perianth-segments* narrower than in the lowland forms of var. *vulgaris*, not or scarcely contiguous at the base. *Carpels* more arched and with the beak longer and more divergent.

We strongly suspect that many of the British records of this variety refer merely to the smaller-flowered forms of var. *vulgaris*.

Huntingdonshire, and doubtless elsewhere.

Germany, France, central Europe; Asia.

*C. palustris* is common in marshes, fens, wet meadows, and springs, and on the banks of rivers and rivulets; ascending to 910 m. in Perthshire; rare on clayey soils and on acidic peat.

The Faeröes, Iceland, Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 2530 m.), Russia, southern Europe; Asia; North America.

## Subtribe II. *HELLEBORINAE*

**Helleborinae** nobis. For characters, see page 104.

### British genera of *Helleborinae*

Genus 2. **Trollius** (see below). *Sepals* yellow, 5—15, deciduous. *Petals* or nectar-leaves ligulate, flat, nectar-pits naked. *Follicles* ∞, free, sessile. *Seeds* biseriate.

Genus 3. **Helleborus** (p. 107). *Sepals* green or purplish, about 5 or 6, persistent. *Petals* or nectar-leaves tubular, more or less 2-lipped. *Follicles* 2—10, often slightly coherent at the base, sessile. *Seeds* biseriate.

Genus 4. ***Eranthis** (p. 109). *Sepals* yellow, 5—8, usually 6, deciduous. *Petals* or nectar-leaves 2-lipped. *Follicles* 5—8, free, stalked. *Seeds* uniseriate.

## Genus 2. Trollius

**Trollius** L. *Sp. Pl.* 556 (1753) et *Gen. Pl.* ed. 5, 243 (1754); Prantl in *Pflanzenfam.* iii, pt. 2, 55 et 56 (1891).

Perennial herbs. *Leaves* with long petioles and much dissected laminae, lobes of the laminae toothed. *Flowers* homogamous, usually self-pollinated. *Sepals* petaloid, yellow, about 5—15, deciduous. *Petals* or nectar-leaves yellow, about 5—15, ligulate, flat, very much smaller than the sepals and more like the stamens, each with a naked nectiferous pit near the base. *Follicles* ∞, free, sessile. *Seeds* biseriate, chalaza inconspicuous.

About 12 species; northern hemisphere.

### 1. TROLLIUS EUROPAEUS. Globe Flower. Plate 104

*Ranunculus globosus* Gerard *Herball* 809 (1597); Ray *Syn.* ed. 3, 272 (1724).

**Trollius europaeus** L. *Sp. Pl.* 556 (1753)!; Smith *Eng. Bot.* no. 28 (1791); *Fl. Brit.* 597 (1800)!; Syme *Eng. Bot.* i, 53 (1863); Rouy et Foucaud *Fl. France* i, 115 (1893).

Icones :—Smith *Eng. Bot.* t. 28; *Fl. Dan.* t. 133; *Svensk Bot.* t. 383; Reichenbach *Icon.* iv, t. 102, fig. 4713 (4 varieties).

*Camb. Brit. Fl.* iii. *Plate 104.* (*a*) Lower leaf. (*b*) Flowers. (*c*) Head of ripening follicles. (*d*) Sepal. (*e*) Nectar-leaves (two enlarged). (*f*) Stamens (two enlarged). (*g*) Follicles. Westmorland (L. B.).

Exsiccata :—Billot, 2805, 2805 bis; Fellman, 14; Reichenbach, 2274; Wirtgen, xiv, 780; 780 b, as *T. europaeus* f. *major*; *Herb. Fl. Ingr.* i, 24.

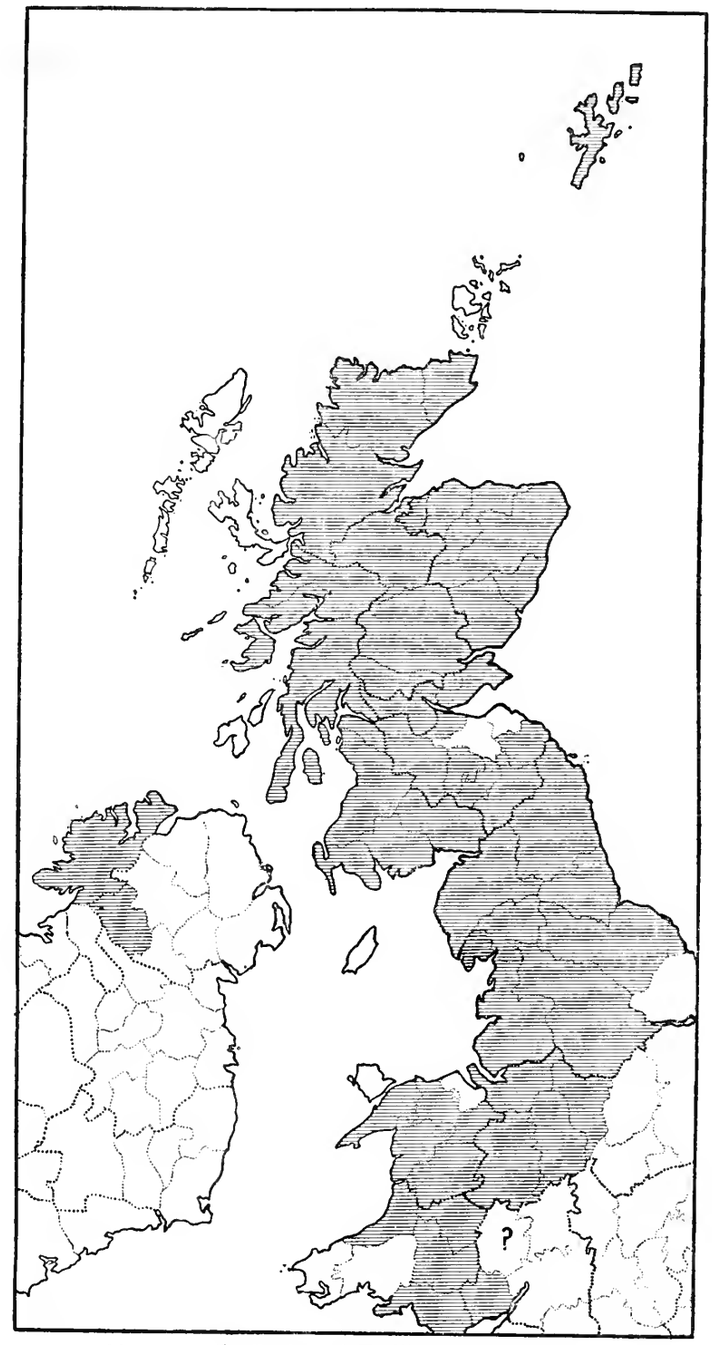
Perennial. *Shoot* glabrous. *Rhizome* short. *Stem* erect, up to about 6 or 7 dm. high. *Radical leaves* with very long petioles; laminae 3-digitate, each main segment bifid half way to nearly the whole way down; margin of the lamina with large, acute, and irregular dentitions. *Stem-leaves* with short petioles or sessile, laminae cut not quite to the base. *Flowers* solitary, large, about 2·0—3·5 cm. in diameter, more or less globose; May and June. *Sepals* yellow, about 10—15, convergent.

*Petals* or nectar-leaves yellow, about 10—15, hidden between the sepals and stamens, ligulate, clawed, nectary at the junction of the limb and the claw, shorter than the sepals. *Stamens* ∞. *Follicles* ∞, transversely wrinkled, remains of stigma persisting. *Seeds* ∞, punctate, almost black.

This species is abundant in the meadows of upper Teesdale where, as is indeed frequently the case elsewhere in the north, it is associated with *Geranium sylvaticum*. The unusual abundance of these two species and the local abundance of *Viola lutea*, *Gentiana verna*, *Bartschia alpina*, and other showy plants give to the meadows of Teesdale in late spring and early summer more the appearance of the flowery sub-Alpine meadows of central Europe than is the case in any other part of the British Isles which we have seen.

Rather local, in wet woods and meadows, on banks of streams, and on the ledges of mountain-rocks, where the water is well-aërated and where the rainfall is at least comparatively high; Wales—Glamorganshire to Denbighshire; England—Monmouthshire, Shropshire, and Derbyshire northwards to the Border; Scotland—from the Border to Zetland, ascending to 825 m. in Perthshire; Ireland—curiously local and confined to the north-west.

Scandinavia, Denmark, Germany, Belgium, France, central Europe (ascending to 2600 m.), Russia, southern Europe; south-western Asia.




Map 41. Distribution of *Trollius europaeus* in the British Isles and Islands

## Genus 3. Helleborus

**Helleborus** [Tournefort *Inst.* 271, t. 144 (1700);] L. *Sp. Pl.* 557 (1753) et *Gen. Pl.* ed. 5, 244 (1754); pro max. part.; Salisbury in *Trans. Linn. Soc.* viii, 304 (1807); Prantl *op. cit.* 56 et 57 (1891).

Perennial herbs. *Leaves* with long petioles and much dissected laminae, lobes of the laminae serrate. *Inflorescence* cymose. *Flowers* pedicelled, drooping, protogynous. *Sepals* about 5 or 6, green, purplish, or white, persistent. *Petals* or *nectar-leaves* about 5—12, green, much smaller than the sepals, tubular, slightly 2-lipped. *Stamens* ∞, whitish or greenish. *Carpels* about 3—10, sessile or subsessile. *Stigma* as long as the rest of the carpel. *Follicles* often joined to some extent at the base, sessile or on a short common stalk. *Seeds* biseriate; testa shining.

About 15 species; Europe and Asia.

### British species of *Helleborus*

1. **H. viridis** (p. 108). *Laminae* of the ground-leaves digitate. *Pedicels* short. *Sepals* green, spreading.

2. **H. foetidus** (p. 108). *Laminae* of the ground-leaves pedate. *Pedicels* long. *Flowers* more clustered and smaller than in *H. viridis*. *Sepals* greenish and marked with purplish green towards the apex, convergent.

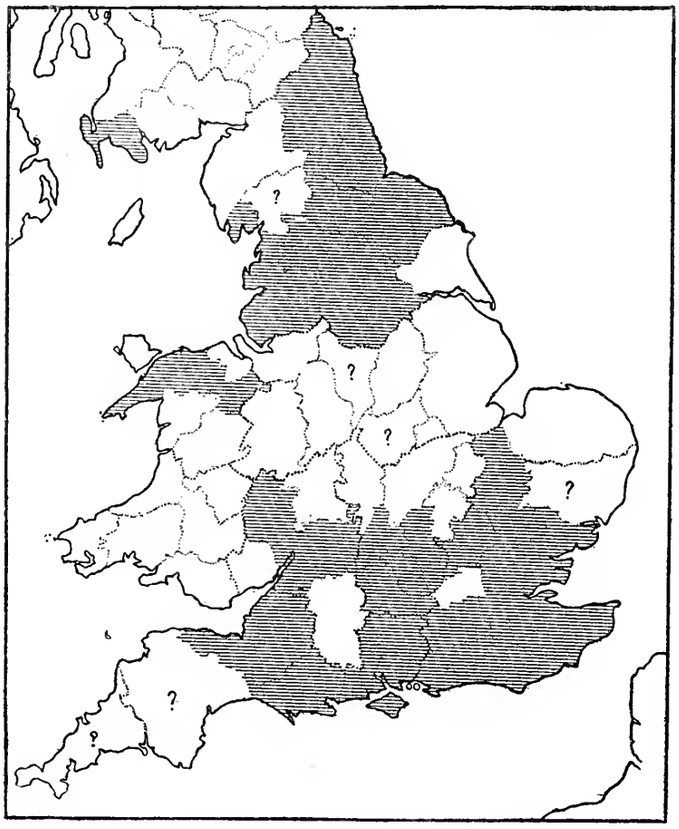
The allied *H. niger*, with white sepals, is the Christmas rose of the gardens: it is indigenous in the south-east of central Europe.

## 1. HELLEBORUS VIRIDIS. Green Hellebore. Plate 105

*Helleborastrum* Gerard *Herball* 825 (1597); *Helleborus niger hortensis flore viridi* Ray *Syn.* ed. 3, 271 (1724).

**Helleborus viridis** L. *Sp. Pl.* 558 (1753)!; Smith *Eng. Bot.* no. 200 (1794)!; *Fl. Brit.* 598 (1800); Syme *Eng. Bot.* i, 56 (1863); Rouy et Foucaud *Fl. France* i, 116 (1893).

British plants seem all to be singularly constant and to conform to the following variety which is distinguished by its glabrous or nearly glabrous shoot without multicellular hairs, by its more pronounced serrations of the leaf-segments, by its smaller flowers which occur 2—3 (not 1—2 together), by its larger oval (not suborbicular) sepals, by its shorter carpels, and by its incurved styles.



Map 42. Distribution of *Helleborus viridis* var. *smithianus* in England and Wales

(*a*) **H. viridis** var. **smithianus** A. Braun in *Ind. Sem. Hort. Berol.* app. 14 (1861); *H. viridis* Smith *loc. cit.*, in sensu stricto!; *H. occidentalis* Reuter [*Cat. Gr. Genève* ex] *Bull. Soc. Bot. France* xvi, 53 [bis] (1869).

Icones :—Smith *Eng. Bot.* t. 200, as *H. viridis*; Curtis *Fl. Lond.* ii, 112, as *H. viridis*; Reichenbach *Icon.* iv, t. 105, fig. 4718, as *H. viridis.*

*Camb. Brit. Fl.* iii. *Plate 105.* (*a*) Lower leaf. (*b*) Flowering branch. (*c*) Sepal and four nectar-leaves. (*d*) Head of follicles. Derbyshire.

Exsiccata :—Bourgeau (*Pyr. Espagn.*), 70, as *H. viridis*; v. Heurck et Martinis, vii, 303, as *H. viridis*; Thielens et Devos, iii, 203, as *H. viridis*; Todaro, 334, as *H. bocconi*; Wirtgen, v, 16, as *H. viridis*; *Lojacono* (*Pl. Sic. Rar.*), 245, as *H. bocconi.*

The plant of the Linnaean herbarium is not the British form.

Perennial. *Rhizome* stout, oblique, rather short. *Shoot* glabrous. *Radicle leaves* aestival, with long petioles, petioles somewhat dilated at the base; laminae digitate, each main segment with 2—4 lobes, lobes elliptical and acute, margin of the lobes coarsely serrate. *Upper leaves* sessile. *Flowers* vernal, 3·5—5 cm. in diameter, drooping; March and April. *Sepals* green (rarely blotched with purple), oval, shortly and bluntly acuminate, usually 5. *Petals* or *nectar-leaves* about 7—12, about a quarter or a third as long as the sepals, shorter than the stamens. *Styles* incurved. *Follicles* slightly connate at the base.

*H. viridis* var. *smithianus* occurs in ash woods and in oak and ash woods and scrub, in lowland districts, usually on calcareous soil; more or less indigenous in several counties from Dorset and Kent to Northumberland and Wigtonshire, but very doubtfully so in many of its recorded stations.

Western Germany, Belgium, France, western Switzerland, Spain, Italy (incl. Sicily).

The aggregate species *H. viridis* occurs in Denmark (? indigenous), Germany, Belgium, France, central Europe, Spain, and Italy. It is naturalised in Scandinavia, northern Germany, Holland, and North America.

## 2. HELLEBORUS FOETIDUS. Stinking Hellebore. Plate 106

*Helleboraster maximus* Gerard *Herball* 826 (1597); Ray *Syn.* ed. 3, 271 (1724).

**Helleborus foetidus** L. *Sp. Pl.* 558 (1753)!; Smith *Eng. Bot.* no. 613 (1799); *Fl. Brit.* 598 (1800); Syme *Eng. Bot.* 58 (1863); Rouy et Foucaud *Fl. France* i, 118 (1893).

Icones :—Smith *Eng. Bot.* t. 613; Woodville *Med. Bot.* i, t. 19; Reichenbach *Icon.* iv, t. 103, fig. 4715.

*Camb. Brit. Fl.* iii. *Plate 106.* (*a*) Lower leaf. (*b*) Flowering branch. (*c*) Portion of stem. (*d*) Portion of flower, showing pedicel, sepal, nectar-leaves, and stamens. (*e*) Nectar-leaves. (*f*) Stamens. (*g*) Head of follicles with persistent perianth. Hort., origin I. of Wight (E. W. H.).

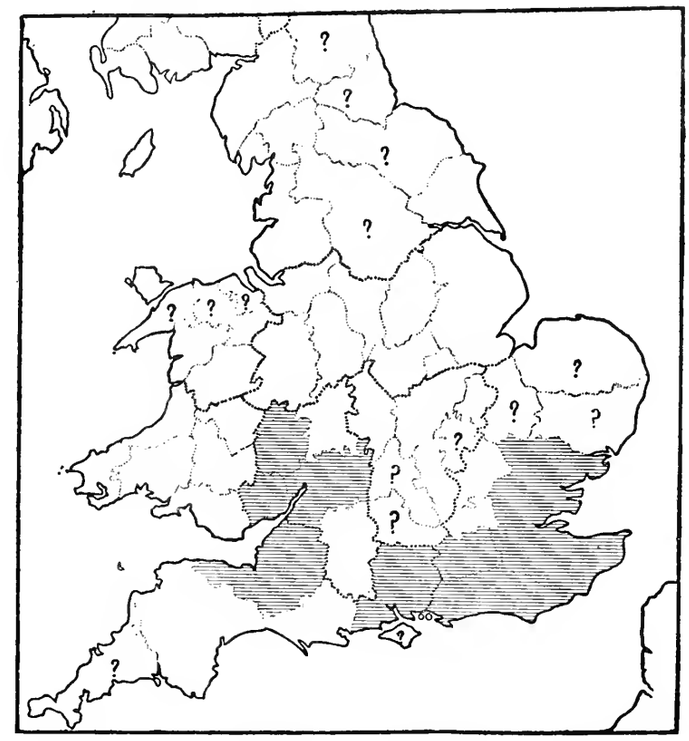
Exsiccata :—Billot, 1496; Welwitsch (*Iter Lusit.*), 384.

Perennial herb with a foetid odour. *Rhizome* stout, oblique. *Shoot* up to 5—6 dm. high. *Ground-leaves* with long petioles; petioles somewhat dilated at the base; laminae pedate, almost coriaceous; lobes narrowly elliptical, serrate, acute. *Pedicel* compressed, bent over in flower, straightening in fruit. *Flowers* numerous, drooping, about 2—3 in diameter; January to May. *Sepals* usually 5, greenish, purplish at the apex, persistent. *Petals* or nectar-leaves 5—10, usually 6—7, shorter than the stamens. *Stamens* about 30—55. *Follicles* 2—5, usually 3, slightly connate at the base, transversely wrinkled, on a short common gynophore.

An interesting paper on "The Seed-Mass and Dispersal of *Helleborus foetidus* Linn." by Dymes (in *Journ. Linn. Soc.*—Bot., xliii, 433 *et seq.* (1916)), has recently been published.

Woods and scrub, in lowland districts, on calcareous soil in south-eastern England and the lower Severn basin, though often a doubtful native. Not indigenous in Scotland or Ireland, and probably not so in Wales.

Germany, Holland (?indigenous), Belgium, France, central Europe, southern Europe.



Map 43. Distribution of *H. foetidus* in England

## Genus 4. *Eranthis

**Eranthis** Salisbury in *Trans. Linn. Soc.* viii, 303 (1807); Prantl in *Pflanzenfam.* iii, pt. 2, 56 et 57 (1891); nomen conservatum; *Helleborus* L. *loc. cit.*, pro min. parte; [*Cammarum* Hill *Brit. Herbal* 47 (1756); *Helleboroïdes* Adanson *Fam. Pl.* ii, 458 (1763)].

Allied to *Helleborus*. *Leaves* fewer, peltate. *Inflorescence* solitary. *Bracts* 3, spiral but with very short internodes, involucroid. *Peduncles* hollow. *Flowers* sessile. *Sepals* yellow or rarely green, 5—8, usually 6, deciduous, very sensitive to heat. *Staminodes* or *petals* or *nectar-leaves* yellow, 5—9, usually 6, more markedly 2-lipped, outer lip larger than the inner one. *Stamens* ∞ but fewer. *Carpels* 3—11, usually 6, with a gynophore. *Seeds* 1-seriate, testa punctate.

About 7 species; Mediterranean region to central Asia. Only British species:—**E. hiemalis*.

### 1. *ERANTHIS HIEMALIS. Winter Aconite. Plate 107

**Eranthis hiemalis** Salisbury *loc. cit.* 304; Syme *Eng. Bot.* i, 55 (1863); Rouy et Foucaud *Fl. France* i, 119 (1893); *Helleborus hiemalis* L. *Sp. Pl.* 557 (1753)!.

Icones:—*Bot. Mag.* t. 3, as *Helleborus hiemalis*; *Fl. Dan.* t. 1391, as *H. hiemalis*; Reichenbach *Icon.* iv, t. 101, fig. 4714; Syme *Eng. Bot.* i, t. 43.

*Camb. Brit. Fl.* iii. *Plate 107.* (*a*, *b*) Whole plants. (*c*) Fruiting branch. Hort. (E. W. H.)

Exsiccata:—Billot, 308; Caruel, 50; v. Heurck et Martinis, vii, 302; Reichenbach, 2273; Thielens et Devos, iv, 303.

Perennial, resting from late May to about January. *Shoot* glabrous, 1—2 dm. high. *Laminae* peltate, suborbicular, palmatisect. *Bracts* with oblong, obtuse, apiculate segments. *Flowers* about 2·5 cm. in diameter; late December to early March. *Sepals* yellow. *Stamens* yellow, about 30 on the average. *Stigma* yellowish. *Follicles* about 1·4—1·7 cm. long including the beak (i.e., the persistent style). *Seeds* about 8, early May.

More or less naturalised in damp copses in the lowlands of England.

Southern Switzerland and Austria, southern Europe from France eastwards to the Balkans; naturalised in Denmark, Germany, Holland, Belgium, northern and central France, northern Spain, and North America.

## Subtribe III. *AQUILEGIINAE*

**Aquilegiinae** nobis; *Isopyreae* Syme *Eng. Bot.* i, 59 (1863).

For characters, see page 104. Only British genus:—*Aquilegia*.

## Genus 5. Aquilegia

**Aquilegia** [Tournefort *Inst.* 428, t. 242 (1700);] L. *Sp. Pl.* 533 (1753) et *Gen. Pl.* ed. 5, 237 (1754); Prantl *op. cit.* 56 et 59 (1891).

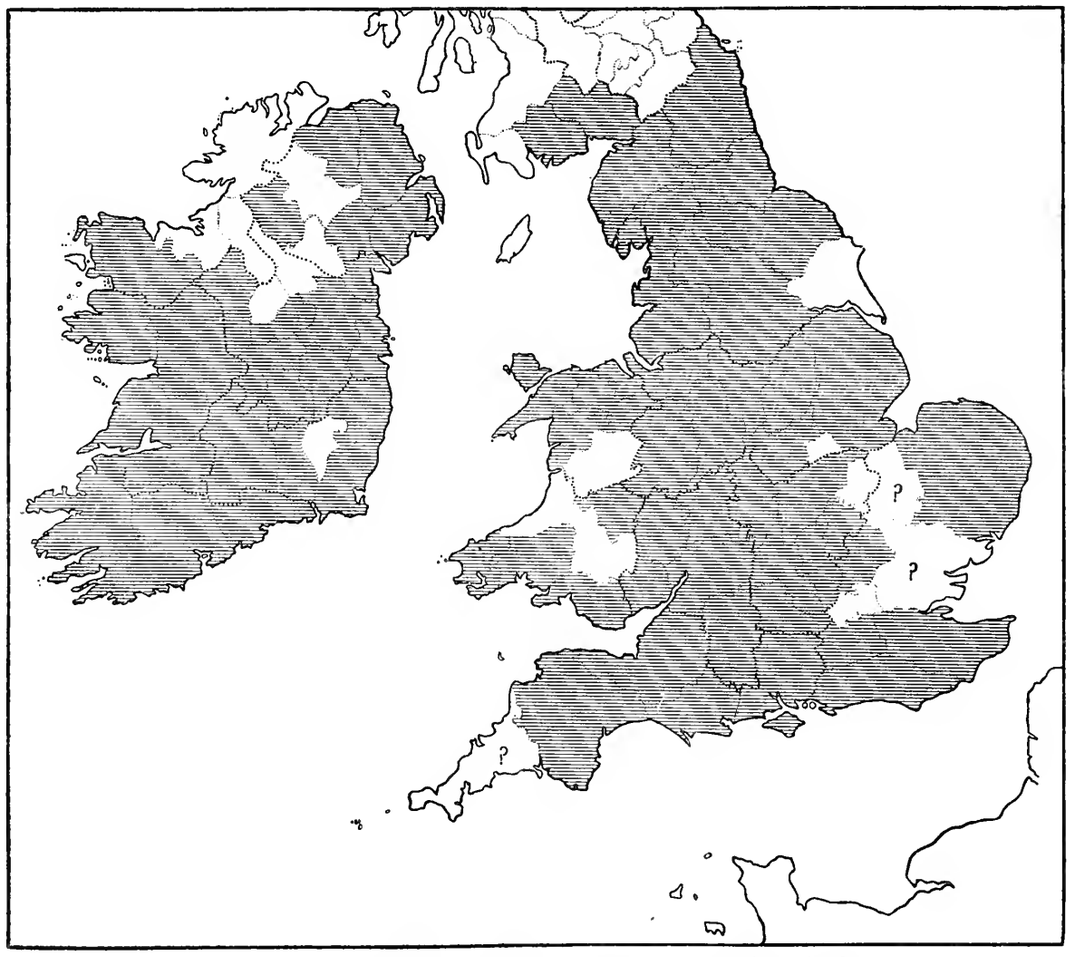
Perennial. *Laminae* 2-ternately or 3-ternately compound. *Flowers* actinomorphic. *Sepals* 5, petaloid, deciduous. *Petals* or *nectar-leaves* 5, large, coloured, each with a spreading tip and a long basal curved hollow spur which passes backwards between the sepals and then curves round towards the axis. *Stamens* in about 10 whorls of 5 each; inner ones sterile, with dilated filaments appressed to the ovary. *Styles* slender. *Follicles* 5, slightly united at the base, erect, sessile. *Seeds* biseriate.

About 50 species; northern hemisphere.

### 1. AQUILEGIA VULGARIS. Columbine. Plate 108

*A. coerulea* Gerard *Herball* 935 (1597), incl. *A. rubra* et *A. multiplex*; *A. flore simplici* Ray *Syn.* ed. 3, 273 (1724).

**Aquilegia vulgaris** L. *Sp. Pl.* 533 (1753); Hudson *Fl. Angl.* 207 (1762), incl. *A. alpina* p. 208; Smith *Eng. Bot.* no. 297 (1796); *Fl. Brit.* 578 (1800); Syme *Eng. Bot.* i, 60 (1863); Rouy et Foucaud *Fl. France* i, 123 (1893).




Map 44. Distribution of *Aquilegia vulgaris* in the British Islands

Icones:—Smith *Eng. Bot.* t. 297; *Fl. Dan.* t. 695; *Svensk Bot.* t. 118; Reichenbach *Icon.* iv, t. 114, fig. 4729; Syme *Eng. Bot.* i, t. 46.

*Camb. Brit. Fl.* iii. *Plate 108.* (*a*) Lower Leaf. (*b*) Flowering branch. (*c*) Fruiting branch. (*d*) Follicle. (*e*) Follicle in transverse section. (*f*) Seeds. Cumberland (L. B.).

Exsiccata:—Billot, 1407; Reichenbach, 1092, as *A. nigricans*; 1289; 1590, as *A. vulgaris* var. *platysepala*; Todaro, 1207; *Herb. Fl. Ingric.* ix, 25.

Perennial. *Rhizome* thick, branched. *Shoot* up to nearly a metre high, erect, branched, stem and branches somewhat hairy. *Leaves* glabrous, slightly glaucous especially above; radical leaves with long petioles, with laminae 2-ternate or 3-ternate; segments stalked, lobed; lobes irregularly, coarsely, and obtusely toothed. *Bracts* and *bracteoles* sessile, lobed or toothed, obtuse. *Petioles* elongating in fruit. *Flowers* drooping, 2—4 cm. in diameter, often double; June. *Sepals* blue, purple, reddish, or white, elliptical to ovate, about 1·5—2·0 cm. long. *Staminodes* or *petals* coloured like the sepals, spur strongly hooked, about 2·5—3·0 cm. long. *Stamens* projecting beyond the petals; filaments white, inner barren ones dilated. *Follicles* with short hairs, 1·5—3·0 cm. long excluding the beak.

Damp copses and woods, usually on calcareous soils, certainly indigenous in ash woods in the west and north of England and doubtless elsewhere, but so often occurring as a relic of cultivation that it is impossible to be certain of its precise range; recorded as a wild plant from Cornwall and Kent northwards to the Border; perhaps not indigenous in Ireland—generally distributed, but local as a native plant.

Southern Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 1860 m. in Switzerland), Russia (central and southern), Spain, Italy; Asia; North America (not indigenous).

### Subtribe IV. **DELPHINIINAE*

**Delphiniinae** nobis; *Delphineae* Syme *Eng. Bot.* i, 61 (1863).

For characters, see page 104.

#### British genera of *Delphiniinae*

Genus 6. ***Delphinium** (see below). *Sepals* unequal, upper one with a long basal spur. *Staminodes* or *petals* spurred, spur entering the calycine spur.

Genus 7. ***Aconitum** (p. 112). *Sepals* unequal, upper one covering the flower like a hood. *Staminodes* 2—5, only 2 well developed, these more or less erect and concealed within the hood.

## Genus 6. *Delphinium

**Delphinium** [Tournefort *Inst.* 426, t. 241 (1700);] L. *Sp. Pl.* 530 (1753) et *Gen. Pl.* ed. 5, 236 (1754); Prantl *op. cit.* 56 et 59 (1891).

Perennial or annual herbs, often poisonous. *Leaves* palmately compound, divided almost to the base. *Inflorescence* a *quasi*-raceme, each inflorescence really reduced to a single flower. *Flowers* protandrous. *Sepals* 5, petaloid, free, nearly equal in size, deciduous, posterior one prolonged into a spur. *Petals* or *nectar-leaves* either 4, 2 postero-lateral ones free, anterior one missing, or (as in the British forms) 2, united, passing into the calycine spur which holds the nectar, the 2 antero-lateral ones and the anterior one missing. *Stamens* ∞. *Follicles* 6—1, free, sessile. *Seeds* biseriate.

The British species belongs to the section *Consolida* (DC. *Syst. Nat.* i, 341 (1818)) the members of which are annual plants, with only a single follicle to each flower.

About 200 species; northern hemisphere.

#### British species of *Consolida*

1. ***D. ajacis** (see below). *Branches* ascending. *Flowers* larger (about 2·5 cm. in diameter). *Style* and *stigma* short. *Follicle* pubescent, oblong.

[***D. consolida** (p. 112). *Branches* spreading. *Flowers* smaller. *Style* and *stigma* longer. *Follicle* glabrous, elliptical, acute.]

### 1. *DELPHINIUM AJACIS. Larkspur. Plate 109

*D. segetum* Ray *Syn.* ed. 3, 273 (1724).

**Delphinium ajacis** L. *Sp. Pl.* 531 (1753) partim?; Reichenbach *Icon.* iv, 20 (1840); [Gay *Monogr.* ined. ex] Grenier et Godron *Fl. France* i, 46 (1847); Syme *Eng. Bot.* i, 62 (1863); M'Nab in *Trans. Bot. Soc. Edinb.* ix, 335 (1868) incl. *D. addendum*; Rouy et Foucaud *Fl. France* i, 131 (1893); *D. consolida* Smith

*Fl. Brit.* 577 (1800)!; *Eng. Bot.* no. 1839 (1808); *Eng. Fl.* iii, 30 (1825); Sibthorp et Smith *Fl. Graec. Prodr.* i, 370 (1806—1809); ? *D. ornatum* Bouché in *Bot. Zeit.* i, 26 (1843).

Icones :—Smith *Eng. Bot.* t. 1839, as *D. consolida*; *Fl. Dan.* t. 683, as *D. consolida*; Reichenbach *Icon.* iv, t. 67, fig. 4670; Baxter *Phaen. Bot.* iv, t. 297, as *D. consolida*; Sibthorp et Smith *Fl. Graec.* t. 504, as *D. consolida.*

*Camb. Brit. Fl.* iii. *Plate 109.* (*a*) Lower part of shoot. (*b*) Upper part of shoot. (*c*) Portion of stem (enlarged). (*d*) End of leaf-lobe (enlarged). (*e*) The five sepals of a single flower. (*f*) Corolla (side view). (*g*) Corolla (front view). (*h*) Portion of infructescence. (*i*) Seeds. (*j*) Seed (enlarged). Cambridgeshire (C. E. M.).

Exsiccata :—Billot, 707.

Annual. *Root* small. *Stem* erect, pubescent, more or less branched as a rule, up to nearly 1 m. high. *Branches* usually ascending. *Lower leaves* petioled; *lamina* palmately tripinnate, ciliate; segments flat, linear; terminal lobes flat, rather acute. *Lower bracts* leaf-like, sessile. *Upper bracts* simple, subulate. *Bracteoles* usually 2 and opposite, hairy, about 5 mm. long. *Inflorescence* solitary. *Flowers* about 2—16 on a branch, simulating a raceme, up to about 2·8 cm. in diameter; July and August. *Sepals* petaloid, greenish outside when in bud, becoming blue as they mature, rarely pinkish or white. *Nectar-leaves* or *petals* pale blue, rarely pinkish or white, upper lobe erect and bifid, lateral lobes ultimately converging. *Stamens* about 15; filaments broad and whitish below, bluish and filamentous above, bending forwards. *Style* and *stigmas* shorter than in *D. consolida*, bent backwards. *Follicle* pubescent, oblong, transversely ridged, up to about 3 cm. long and 0·5 broad. *Seeds* nearly black, with transverse and undulating ridges, about 3 mm. long; late August and September.

This plant is, beyond all doubt, the *D. consolida* of Smith and the older English authorities. Reichenbach (1840) and J. Gay (ex Grenier et Godron *loc. cit.*) applied the name *D. consolida* to the following species, and gave the name *D. ajacis* to Smith's *D. consolida*. With some misgiving, we follow Reichenbach in his allocation of the two names.

Formerly abundant in cornfields in parts of Cambridgeshire; now a sporadic cornfield weed in southern and eastern England, and in the Channel Islands; it is still a common plant in cottage gardens in Cambridgeshire, and springs up more or less abundantly as a weed in disused gardens, in allotments, in old brick-pits, and in waste places; quite adventitious in Wales, in northern England, and in Scotland, and not recorded for Ireland.

Indigenous in the Mediterranean region; naturalised in western and central Europe northwards to Holland and Germany, and in North America.

## [*DELPHINIUM CONSOLIDA]

**Delphinium consolida** L. *Sp. Pl.* 530 (1753) partim?; Reichenbach *Icon.* iv, 20 (1840); Grenier et Godron *Fl. France* i, 45 (1847); Syme *Eng. Bot.* i, 63 (1863); M'Nab *op. cit.*; Rouy et Foucaud *Fl. France* i, 129 (1893).

Icones :—Reichenbach *Icon.* iv, t. 66, fig. 4669; Syme *Eng. Bot.* i, t. 47, top right-hand figure.

Exsiccata :—Billot, 1407; Billot (*Fl. Gall. et Germ.*), 102; *Herb. Fl. Ingric.*, i, 26.

Closely allied to the preceding species from which it differs in the following characters :—*Shoot* less tall. *Branches* more divaricate. *Flowers* smaller. *Style* and *stigma* longer. *Follicle* glabrous, elliptical-acute. *Seeds* smaller.

Sporadic and rare, in cornfields in Jersey and in southern England; adventitious, as a rule, in England.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe, Asia; naturalised in North America.

## Genus 7. *Aconitum

**Aconitum** [Tournefort *Inst.* 424, t. 239 et t. 240 (1700);] L. *Sp. Pl.* 532 (1753) et *Gen. Pl.* ed. 5, 236 (1754); Prantl *op. cit.* 56 et 60 (1891).

Perennial, poisonous herbs. *Roots* tuberous-fusiform, lateral branches rather stout. *Stem* erect. *Leaves* palmatisect or palmatipartite. *Bracts* small. *Bracteoles* 2, opposite. *Inflorescence* solitary. *Flowers* grouped to simulate a raceme. *Sepals* petaloid, 5, upper ones covering the rest of the flower like a hood or helmet. *Nectar-leaves* or *petals* hidden within the hood-like sepal, 2—5; the 3 lower ones small or absent; the 2 upper ones more or less erect, stalked, dilated at the tips to form the nectaries. *Stamens* ∞. *Follicles* 7—1, usually 5—3, sessile, free.

About 60 species; northern hemisphere

## 1. *ACONITUM NAPELLUS. Monkshood or Wolf's-bane. Plate 110

**Aconitum napellus** L. *Sp. Pl.* 532 (1753); Miller *Gard. Dict.* ed. 8, no. 5 (1768); Smith *Eng. Fl.* iii, 31 (1825); Syme *Eng. Bot.* i, 64 (1863); Rouy et Foucaud *Fl. France* i, 140 (1893).

Icones:—Forster in *Eng. Bot. Suppl.* t. 2730; *Svensk Bot.* t. 46; Baxter *Phaen. Bot.* ii, 87; Reichenbach *Icon.* iv, t. 92, fig. 4700.

*Camb. Brit. Fl.* iii. *Plate 110.* (*a*) Lower part of plant. (*b*) Radical leaf. (*c*) Flowering branch. (*d*) Lateral sepals. (*e*) Hood. (*f*) Flower with hood and lateral sepals taken away. (*g*) Fruit. (*h*) Follicle. Herefordshire (S. H. B.).

Exsiccata:—Billot, 503 [cf. var. *compactum* Rchb., R. and F.]; 2406, as *A. eminens*; Bourgeau (*Pl. d'Esp.* 1851); Fries, vii, 23; Reichenbach, 1984, as *A. angustifolium*; 2277, as *A. pyramidale*; 2588, as *A. multifidum.*

Perennial, very poisonous. *Root* black. *Shoot* about 0·6—1·0 m. high, slightly hairy, little branched. *Lower leaves* with long petioles. *Stem leaves* with short petioles. *Laminae* palmatisect, segments cuneate at the base, lobes acute. *Flowers* about 2·5—3·0 cm. long; late May to early August. *Sepals* blue, pale blue, or white; 2 lower ones oblong, 2 lateral ones suborbicular, hood laterally compressed. *Filaments* broad-based. *Follicles* usually 3, glabrous, transversely marked, about 2·5 cm. long and 0·5 broad. *Seeds* very dark brown or nearly black, testa spongy.

The indigenousness of the monkshood in England is a matter of dispute; but we think that a study of the history of the plant in this country ought to set all doubts at rest. It must be borne in mind that the monkshood is a conspicuous and ornamental plant, with pronounced medicinal properties: it is therefore just such a plant as the early botanists would have recorded, had they found it growing in wild localities. To Gerard (*Herball* 823 (1597)), however, it was only a cultivated plant, "universally known in our London gardens"; and botanists such as Ray, Dillenius, Hudson, and Withering do not mention it at all. Its first appearance in British botanical works was in Purton's *Midland Flora* iii, 47 (1821); and in 1825 Sir J. E. Smith inserted it in his *English Flora.* However, the Rev. E. S. Marshall (*Suppl. Fl. Somerset* 8 (1914)) is satisfied that it is "a true native" in Somerset; and Mr James Britten (in *Journ. Bot.* lii, 221 (1914)) has endorsed this view. We are fully aware that the monkshood is nowadays very abundant locally in several parts of England and Wales, and particularly so in parts of Somerset; but it is inconceivable that such a handsome and conspicuous medicinal plant as *Aconitum napellus* could have been completely overlooked or ignored by all British botanists during the seventeenth and eighteenth centuries and the first part of the nineteenth. There is therefore, in our judgment, no alternative to the view that the plant in this country is a comparatively recent escape from cultivation.

The Rev. E. S. Marshall (*op. cit.*) further states that "Dr O. Stapf, of Kew, who has made a special study of the genus, told me (May, 1913) that he had been unable to meet with exactly our English plant on the Continent." It will be most interesting if an English form of the species prove to be endemic. However, the species is exceedingly variable, over 50 forms of it having been definitely named; and it is possible that the English form in question will yet be found abroad. The species is known to be naturalised in Denmark. The indigenousness of the plant used to be debated in that country, as the Danish form was thought to be endemic. However, the particular Danish form has been found to grow in Austria, whence it was probably transferred to Denmark by monks. Dr Ostenfeld, who informed us of these circumstances, regards it as now settled that *Aconitum napellus* is not native in Denmark[1].

The plant is still increasing its area in England and Wales. It prefers stream-sides, especially those passing through villages, as it is a nitrophilous species both in England and in the Alps. Recently, it has appeared in Cambridgeshire. We are informed that it was for a time grown as a crop in two or three fields to supply some manufacturing pharmacist in London, but that the experiment was not a financial success. The cultivation of the plant therefore ceased; but descendants of the cultivated specimens occur (and are increasing) by stream-sides and in copses, in the vicinity of the farms where the monkshood was for a few years cultivated.

Locally abundant by stream-sides and (rarely) in ash-oak woods, especially in south-western England and in Wales, from Cornwall and Hampshire northwards to Berkshire, Hertfordshire, Cambridgeshire, and Denbighshire.

Sweden (? indigenous), Denmark (doubtfully indigenous), Germany, Holland (doubtfully indigenous), Belgium, France, central Europe (ascending to 2620 m., and—as var. *alpinum*—even to 2925 m. in Switzerland), western Russia, southern Europe; Asia. Probably not indigenous in western Europe.

## Tribe II. *ANEMONEAE*

**Anemoneae** DC. *Syst. Nat.* i, 129 et 168 (1818); Rouy et Foucaud *Fl. France* i, 7 (1893); Prantl *op. cit.* 54 et 60 (1891) partim.

For characters, see page 104.

### Subtribes of *Anemoneae*

Subtribe V. **Clematidinae** (p. 114). Lianes. *Stem-leaves* opposite. *Involucre of bracts* absent (in the British species) or calyciform. *Sepals* petaloid, valvate or induplicate. *Nectar-leaves* or petals absent. *Stigmas* persistent, hairy, lengthening and becoming feathery in fruit. *Seed* suspended.

[1] Since the above was printed, we have sent Cambridgeshire specimens of the monkshood to Dr Stapf: he has kindly replied stating that these specimens differ from the other British form he knew. In our judgment, still other British forms occur.

Subtribe VI. **Anemoninae** (p. 115). Perennial herbs. *Leaves* radical. *Bracts* usually leaf-like, petaloid in *Adonis*. *Sepals* petaloid, imbricate. *Nectar-leaves* absent. *Stigmas* either deciduous or persistent and with long hairs in fruit as in *Clematis*. *Seed* suspended.

Subtribe VII. **Myosurinae** (p. 124). Small, annual herbs. *Leaves* radical. *Sepals* petaloid, imbricate. *Nectar-leaves* present, each with a tubular limb. *Stamens* few. *Achenes* very numerous. *Seed* suspended.

Subtribe VIII. **Ranunculinae** (p. 124). Annual or perennial herbs. *Leaves* either all radical or radical and stem-leaves alternate. *Sepals* not or scarcely petaloid, imbricate. *Nectar-leaves* present, with a small basal nectary and a large petaloid limb. *Seed* erect or ascending, suspended.

## Subtribe V. *CLEMATIDINAE*

**Clematidinae** nobis; *Clematidae* DC. *Syst. Nat.* i, 129 et 131 (1818).

For characters, see page 113. Only British genus:—*Clematis*.

## Genus 8. Clematis

**Clematis** [Dillenius *Hort. Eltham.* 86 (1732);] L. *Sp. Pl.* 543 (1753) et *Gen. Pl.* ed. 5, 242 (1754); Prantl *op. cit.* 61 et 62 (1891) [*Clematitis* Tournefort *Inst.* 293, t. 150 (1700); *Viticella* Dillenius *App. Cat. Giss.* suppl. 165 (1719)].

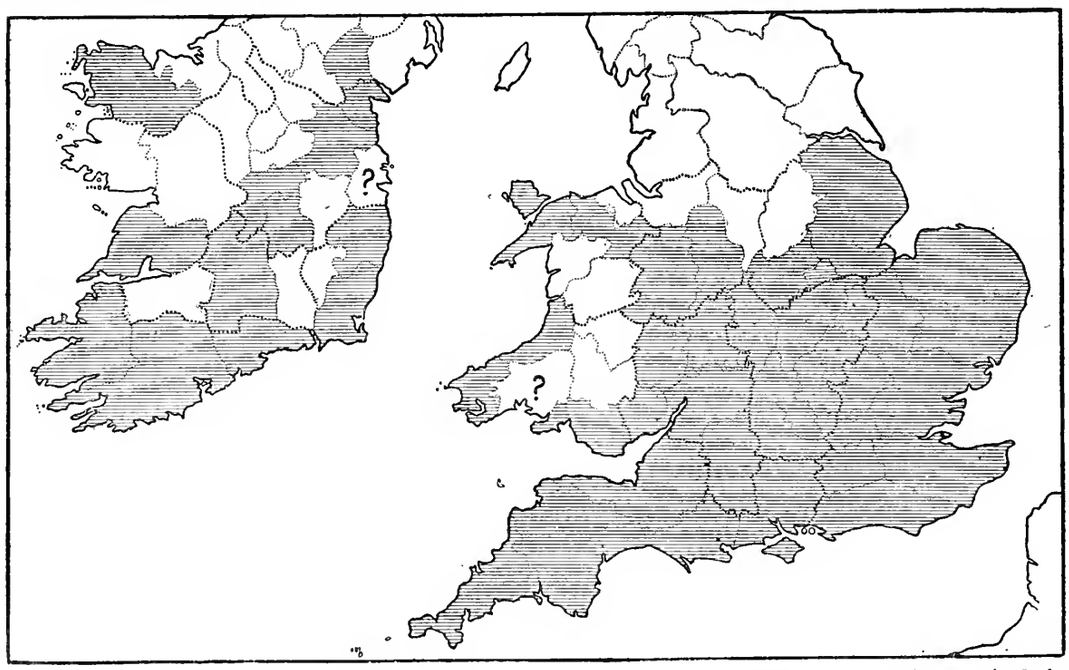
Perennial, usually climbing plants. *Stems* weak. *Petioles* tendriloid. *Laminae* usually compound. *Inflorescence* axillary or terminal. *Flowers* protandrous, actinomorphic, usually without nectar. *Sepals* 4—8, usually 4, deciduous. *Stamens* ∞, filaments coloured. Carpels ∞; each with a long style, elongating in fruit when it is usually covered with numerous spreading silky hairs.

The only British species (*C. vitalba*) belongs to the section *Flammula* (DC. *Syst. Nat.* i, 132 et 133 (1818)) distinguished by the absence of an involucre of bracts and of nectar-leaves or petals.

About 170 species; temperate and tropical zones.

### 1. CLEMATIS VITALBA. Traveller's Joy or Old Man's Beard. Plate III

*Vitis sylvestris solani foliis* Turner *Names* G viii back (1548); *Viorna* Gerard *Herball* 739 (1597); *C. latifolia seu atragene quibusdam* Ray *Syn.* ed. 3, 258 (1724).




Map 45. Distribution of *Clematis vitalba* in the British Islands. Possibly the species is not indigenous in Ireland

**Clematis vitalba** L. *Sp. Pl.* 543 (1753); Smith *Eng. Bot.* no. 612 (1799)!; *Fl. Brit.* 583 (1800); Syme *Eng. Bot.* i, 2 (1863); Rouy et Foucaud *Fl. France* i, 4 (1893).

Icones:—Smith *Eng. Bot.* t. 612; Curtis *Fl. Lond.* ii, t. 106; Jacquin *Fl. Austr.* iv, t. 308; Reichenbach *Icon.* iv, t. 64, fig. 4667.

*Camb. Brit. Fl.* iii. *Plate 111.* (*a*) Flowering branch. (*b*) Head of achenes. (*c*) Achene. Isle of Wight (E. W. H.).

Exsiccata:—Billot, 1101; Reichenbach, 2086, as *C. banatica.*

Perennial, climbing shrub. *Rhizome* freely suckering. *Stem* straggling, somewhat hairy, weak, held up by the cirrhose petioles. *Laminae* pinnate; pinnae 3—5, stalked, ovate, more or less cordate at the base, margin coarsely and irregularly toothed or rarely entire, acute, almost glabrous, up to about 6 cm. long and 4·5 broad. *Flowers* with a faint almond-like odour, about 2 cm. in diameter; July to early September. *Perianth* with 4 segments. *Sepals* yellowish brown, oblong, densely hairy on both surfaces, rather thick, caducous, about 10 mm. long and 3 broad. *Stamens* ∞, about as long as the sepals, conspicuous, pale yellow. *Ovary* green, minute; style long, with long silky hairs, about 2 cm. long in fruit; stigma yellowish, minute. *Achene* compressed, reddish brown, about 3 mm. long (excluding the persistent style); September and October.

In the whole of southern and south-central England, *Clematis vitalba* is indigenous and locally very abundant. In northern England and in Scotland, it is not native, though it is fully naturalised here and there, as, for example, on the banks of the river Tay, near Dunkeld, in Perthshire. In Ireland, it is more difficult to be certain of its natural range: according to Praeger (*Irish Top. Bot.* p. 1), it is only self-sown in most of its recorded stations; and in some others it has merely run wild from gardens.

Hedgerows, scrub, open places in woods; from Cornwall and Kent northwards to Anglesey and Norfolk, common in some of the western counties, local in the eastern; introduced in the north of England and Scotland, as in Perthshire; here and there in Ireland, except in the north; nearly always on calcareous soils.

Germany, Holland, Belgium, France, central Europe (ascending to 1050 m.), southern Europe; northern Africa.

## Subtribe VI. *ANEMONINAE*

**Anemoninae** nobis; *Anemoneae* DC. *loc. cit.*, in sensu stricto.

For characters, see page 114.

### British genera of *Anemoninae*

Genus 9. **Anemone** (see below). Geophilous herbs. *Leaves* radical. *Bracts* 3, involucroid, simple or compound, sepaloid or not. *Sepals* 4—20, petaloid. *Nectar-leaves* 0 or (in section *Pulsatilla*) sometimes rudimentary. *Achenes* ∞, with feathery and persistent styles.

Genus 10. †**Adonis** (p. 118). *Stem-leaves* present. *Bracts* 5—8, involucroid, sessile, petaloid. *Sepals* 3—20, petaloid, longer than the bracts. *Nectar-leaves* 0. *Achenes* ∞, with non-feathery styles. *Seed* pendulous.

Genus 11. **Thalictrum** (p. 118). *Stem-leaves* present. *Bracts* not involucroid. *Sepals* 4—10 (4—5 in the British species), small, petaloid, caducous. *Filaments* long, showy. *Nectar-leaves* 0. *Anthers* projecting beyond the other parts of the flower, filaments coloured. *Achenes* few, styles not feathery.

## Genus 9. Anemone

**Anemone** [Tournefort *Inst.* 275, t. 147 (1700) emend.;] L. *Sp. Pl.* 538 (1753) et *Gen. Pl.* ed. 5, 241 (1724); Prantl *op. cit.* 61 (1891).

Perennial, acrid herbs. *Leaves* compound, mostly radical, rarely a pair of opposite *stem-leaves*. *Inflorescence* solitary. *Peduncle* long. *Bracts* in a whorl of 3 to each flower. *Pedicel* very variable in length. *Perianth* monochlamydeous, sometimes apparently dichlamydeous owing to the shortness of the pedicel (as in *A. hepatica*), blue, red, or white, rarely yellow; segments free, 4—20, imbricate, often hairy. *Nectar-leaves* usually absent (rudimentary in some species of the section *Pulsatilla*). *Stamens* ∞, outer ones sometimes hemi-petaloid. *Carpels* ∞, stigmas either naked or feathery. *Achenes* ∞, sessile.

About 90 species; cosmopolitan.

### British sections of *Anemone*

Section I. **Anemonanthea** (see p. 116). *Pedicels* long. *Stamens* all perfect. *Styles* glabrous, not lengthening much in fruit.

Section II. **Pulsatilla** (p. 117). *Pedicels* distinct, at least in fruit. *Outer stamens* sometimes imperfect and nectiferous. *Styles* persistent, lengthening and becoming covered with long and conspicuous silky hairs in fruit.

## Section I. *ANEMONANTHEA*

**Anemonanthea** DC. *Syst.* i, 196 (1818); Rouy et Foucaud *Fl. France* i, 43 (1893); *Eu-Anemone* Syme *Eng. Bot.* i, 11 (1863) as a subgenus.

For characters, see p. 115.

### British species of *Anemonanthea*

1. ***A. apennina** (see below). *Pedicels* erect after flowering. *Segments of the involucre* markedly stalked. *Sepals* blue, narrower than in the two following species.

2. ***A. ranunculoïdes** (see below). *Pedicels* curved after flowering. *Segments of the involucre* almost sessile. *Sepals* yellow, pubescent on the outside.

3. **A. nemorosa** (p. 117). *Pedicels* much curved after flowering. *Segments of the involucre* markedly stalked. *Sepals* usually white and more or less tinged with purple, more rarely rose, violet or blue, glabrous.

## 1. *ANEMONE APENNINA. Plate 112

*A. geraniifolia* Gerard *Herball* 304 (1597); *Ranunculus nemorosus flore purpureo-caeruleo* Parkinson *Theatr. Bot.* 325 (1640); Dillenius in Ray *Syn.* ed. 3, 259 (1724).

**Anemone apennina** L. *Sp. Pl.* 541 (1753)!; Smith *Fl. Brit.* 581 (1800); Syme *Eng. Bot.* i, 12 (1863); Rouy et Foucaud *Fl. France* i, 43 (1893).

Icones :—Smith *Eng. Bot.* t. 1062; Curtis *Fl. Lond.* ii, 111; Reichenbach *Icon.* t. 47, fig. 4645; Syme *Eng. Bot.* i, t. 10.

*Camb. Brit. Fl.* iii. *Plate 112.* (*a*) Plant in flower. (*b*) Radical leaf. (*c—d*) Flowering scapes. (*e*) Fruit. (*f*) Achenes (one enlarged).

Exsiccata :—*Pl. Ital. Sel.*, vii, 258; Porta et Rigo (*Iter II Ital.*), vii, 258; Todaro, 606.

Perennial. *Rhizome* stout. *Shoot* glabrous or nearly so, 7—22 cm. high. *Ground-leaves* 1—3, biternate, leaflets pinnate, margin coarsely and rather bluntly toothed. *Peduncle* arising close to the leaf. *Bracts* 3, stalked, leaf-like, segments pinnatifid, coarsely and bluntly toothed. *Pedicel* nearly as long as the peduncle. *Flowers* about 3·5—5·0 cm. in diameter; May. *Sepals* blue, paler outside, ∞, ligulate, glabrous. *Achenes* in a subglobose head, glabrous; beak only about a quarter as long as the rest of the achene.

More or less naturalised in woods and copses, as in Kent, Surrey, Middlesex, Hertfordshire, Berkshire, Bedfordshire, Shropshire, Leicestershire, Yorkshire, and Banffshire.

Southern Europe; Asia, eastwards to Persia. Naturalised in western and central Europe, northwards to Denmark.

## 2. *ANEMONE RANUNCULOÏDES. Plate 113

*A. nemorum lutea* Gerard *Herball* 306 (1597).

**Anemone ranunculoïdes** L. *Sp. Pl.* 541 (1753)!; Smith *Fl. Brit.* 582 (1800)!; Syme *Eng. Bot.* i, 13 (1863); Rouy et Foucaud *Fl. France* i, 44 (1893).

Icones :—Smith *Engl. Bot.* t. 1484; *Fl. Dan.* t. 140; *Svensk Bot.* t. 405; Reichenbach *Icon.* iv, t. 47, fig. 4643.

*Camb. Brit. Fl.* iii. *Plate 113.* (*a*) Plant in flower. (*b, c*) Flowering scapes. (*d*) Fruit. (*e*) Achenes (one enlarged). Hort. (S. H. B.).

Exsiccata :—Billot, 3; 3 bis; 302; v. Heurck et Martinis, vii, 301; *Herb. Fl. Ingric.*, i, 5.

Perennial. *Rhizome* elongate, rather stout. *Shoot* glabrous, about 10—25 cm. high. *Ground-leaves* with long petioles; laminae compound, with 3—5 main segments. *Peduncles* slender, arising at some distance from the leaf. *Bracts* leaf-like, ternate; segments ternate, almost sessile, deeply 3-pinnatifid, margin coarsely and rather bluntly toothed. *Pedicels* shorter than in *A. nemorosa*. *Flowers* 1—2, about 2—3 cm. in diameter; May. *Sepals* yellow, usually 5, rarely 6—8, elliptical, overlapping at the base, slightly hairy on the outside. *Carpels* ∞, pubescent, stigma as long as the ovary. *Achenes* hairy; beak long, slender.

Naturalised in copses and shrubberies, in Kent, Suffolk, Norfolk, Hertfordshire, Berkshire, Shropshire, Leicestershire, Nottinghamshire, Yorkshire, and Perthshire.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, northern and central Russia, southern Europe; south-western Asia.

### 3. ANEMONE NEMOROSA. Wood Anemone. Plate 114

*A. nemorum alba* Gerard *Herball* 306 (1597); Ray *Syn.* ed. 3, 259 (1724).

**Anemone nemorosa** L. *Sp. Pl.* 541 (1753)!; Smith *Eng. Bot.* no. 355 (1796)!; *Fl. Brit.* 581 (1800); Syme *Eng. Bot.* i, 12 (1863); Rouy et Foucaud *Fl. France* i, 44 (1893).

Icones:—Smith *Eng. Bot.* t. 355; Curtis *Fl. Lond.* i, t. 113; *Fl. Dan.* t. 549; *Svensk Bot.* t. 3; Reichenbach *Icon.* iv, t. 47, fig. 4644.

*Camb. Brit. Fl.* iii. *Plate 114.* (*a*) Plant in flower. (*b, c, d*) Flowering scapes. (*e*) Fruit. (*f*) Achenes (one enlarged). Huntingdonshire (E. W. H.).

Exsiccata:—Billot 205; Ehrhart, 145; Wirtgen, xix, 1054, as *A. nemorosa* var. *purpurea*; *Herb. Fl. Ingric.* i, 6.

Perennial. *Rhizome* elongate, rather slender. *Shoot* with a few scattered short hairs, about 15—30 cm. high. *Ground-leaves* 1—2, appearing before the flowers, not sheathed at the base; petioles long; laminae biternate; slightly stalked; segments cuneate below, 3-lobed above, lobes with 2—5 acute teeth. *Peduncles* arising at some distance from the leaf. *Bracts* 3, leaf-like, sheathed at the base; each markedly stalked; segments, 3—5, cuneate below, acutely but irregularly toothed above. *Pedicels* rather long, bending over in fruit. *Flowers* about 3—4 cm. in diameter; mid-April to June. *Sepals* usually white, often more or less tinged with purple, especially on the outside, rarely purple; segments 5—9, usually 6, elliptical, glabrous. *Carpels* pubescent. *Achenes* beaked, pubescent, beak rather long.

The double-flowered form occurs occasionally. Various colour-forms are also known.

Common; woods, scrub, and shady hedgebanks, northwards to Sutherlandshire, ascending to about 850 m. in Scotland; often persisting, as a relic of former woodland, in grassland and even moorland.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 1466 m. in the Tyrol), Russia, southern Europe; south-western Asia.

## Section II. *PULSATILLA*

**Pulsatilla** [Tournefort *Inst.* 284, t. 148 (1700); Miller *Abr. Gard. Dict.* ed. 4, iii (1754); as a genus;] DC. *Syst.* i, 189 (1818); Syme *Eng. Bot.* i, 10 (1863) as a subgenus; Rouy et Foucaud *Fl. France* i, 38 (1893).

For characters, see page 116. Only British species:—*A. pulsatilla.*

### 4. ANEMONE PULSATILLA. Pasque Flower. Plate 115

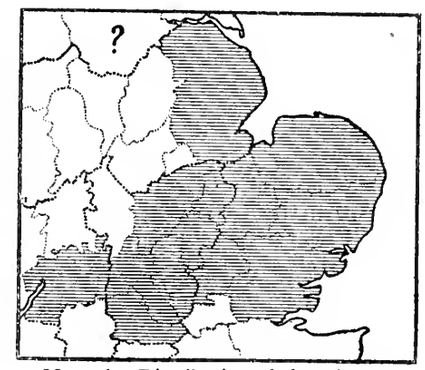
*Pulsatilla vulgaris* Gerard *Herball* 314 (opposite p. 309) (1597); *P. folio crassiore et majore flore* Ray *Syn.* ed. 3, 260 (1724).

**Anemone pulsatilla** L. *Sp. Pl.* 539 (1753)!; Smith *Eng. Bot.* i, no. 51 (1792)!; *Fl. Brit.* 580 (1800); Syme *Eng. Bot.* i, 10 (1863); Rouy et Foucaud *Fl. France* i, 39 (1893); *Pulsatilla vulgaris* Miller *Gard. Dict.* ed. 8, no. 1 (1768); *A. pratensis* Sibthorp *Fl. Oxon.* 169 (1794) non Linn.; *A. pulsatilla* var. *praecox* Gaudin *Fl. Helv.* iii, 484 (1828).

Icones:—Smith *Eng. Bot.* t. 51; Graves and Hooker in Curtis's *Fl. Lond.* ed. 2; Relhan *Fl. Cantab.* t. 3; *Fl. Dan.* t. 153; *Svensk Bot.* t. 292, as *A. pulsatilla*; Reichenbach *Icon.* iv, t. 54, fig. 4657, as *Pulsatilla vulgaris.*

*Camb. Brit. Fl.* iii. *Plate 115.* (*a*) Plant in flower, with part of rhizome. (*b—e*) Flowers. (*f*) Fruit. (*g*) Achene. Cambridgeshire (E. W. H.).

Exsiccata:—Ehrhart, 135; Thielens et Devos, iv, 351.



Map 46. Distribution of *A. pulsatilla* in England

Perennial. *Rhizome* stout. *Shoot* more or less hairy, up to about 15 cm. high. *Ground-leaves* not mature until the flowers have faded, sheathed at the base, petioled; laminae twice or thrice pinnate, segments linear. *Peduncle* stout, terete, hairy. *Bracts* 3, sessile, sheathed at the base, each cut into about 6 long linear segments. *Pedicel* about 1·0—2·5 cm. long when in flower, lengthening as the flower ages and the fruit ripens, 10—15 cm. long in fruit, and then erect. *Flowers* 1, about 3—4 cm. in diameter, protandrous, nodding in flower, erect at anthesis, opening only in warm weather; early April to early June. *Sepals* purple, about 6, campanuloid, with numerous appressed silky hairs on the outside. *Stamens*

all normal. *Achenes* fusiform. *Styles* long, persistent, lengthening in fruit and then covered with long spreading silky hairs.

Local, on calcareous grassland; from Gloucestershire and Essex northwards to Lincolnshire; apparently extinct in Yorkshire.

Sweden (central and southern), Denmark, Germany, Holland, Belgium, France, central Europe, Russia, northern Italy, Spain, Bulgaria; Asia.

## Genus 10. †Adonis

**Adonis** [Dillenius *App. Cat. Plant.* 109 (1719);] L. *Sp. Pl.* 547 (1753) et *Gen. Pl.* ed. 5, 242 (1754); Prantl *op. cit.* 61 et 66 (1891).

Annual or perennial herbs. *Laminae* much divided, lobes linear. *Inflorescence* solitary. *Involucre* of 5—8 bracts (usually regarded as sepals), petaloid, imbricate, deciduous. *Sepals* (usually regarded as petals) 5—16, petaloid, yellow or red. *Nectar-leaves* absent. *Stamens* ∞. *Stigma* deciduous. *Achenes* in an elongate head. *Seeds* pendulous.

About 20 species; Europe, Asia, northern Africa.

### 1. †ADONIS AUTUMNALIS. Pheasant's Eye. Plate 116

*Flos adonis flore rubro* Gerard *Herball* 310 (1597); *Flos adonis* Ray ed. 3, 251 (1724).

**Adonis autumnalis** L. *Sp. Pl.* ed. 2, 771 (1762)!; Smith *Eng. Bot.* no. 308 (1796)!; *Fl. Brit.* 586 (1800); Syme *Eng. Bot.* i, 14 (1863); Rouy et Foucaud *Fl. France* i, 53 (1893); [*A. annua* var. *atrorubens* L. *Sp. Pl.* 547 (1753);] *A. annua* Miller *Gard. Dict.* ed. 8, no. 1 (1768); *A. atrorubens* Dalla Torre und Sarnthein *Farn- und Blütenpfl. Tirol* ii, 304 (1909).

Icones:—Smith *Eng. Bot.* t. 308; Curtis *Fl. Lond.* i, 106; Reichenbach, iii, *Icon.* t. 24, fig. 4621; Baxter *Brit. Phaen. Bot.* i, t. 7.

*Camb. Brit. Fl.* iii. *Plate 116.* (*a*, *b*) Fertile shoots. Dorset (G. E. F.).

Exsiccata:—Billot, 1102; Bourgeau (*Pyr. Espagn.*), 364; v. Heurck et Martinis, iv, 151; A. Schultz, 3; Welwitsch (*Iter Lusit.*), 486; Wirtgen, xiv, 779.

Annual. *Shoot* erect, up to about 4 dm. high, nearly glabrous. *Leaves* sessile; laminae twice or thrice pinnate, lobes linear acute. *Receptacle* elongate in fruit. *Flowers* 1·5—1·7 cm. in diameter; May to September. *Bracts* (or sepals) purplish, usually 5, somewhat membranous, deciduous, glabrous, divaricate. *Sepals* (or petals) bright crimson, with a very dark purple spot near the base, broadly oboval, contiguous or overlapping, concave, often emarginate, 5—8. *Filaments* whitish below, purplish above. *Anthers* brownish-purple. *Ovaries* dark purple. *Achenes* ∞, broadly cylindrical, reticulate.

Early English records of *A. aestivalis* would seem to be all referable to *A. autumnalis*.

Rare as a weed in cornfields on a chalky or gravelly soil in southern England: Dorset, Isle of Wight, Wiltshire, Suffolk, and perhaps elsewhere, though less common than formerly; usually adventitious.

Naturalised in Denmark, Germany, Holland, and Belgium; France, central Europe, southern Europe; northern Africa; North America (naturalised).

## Genus 11. Thalictrum

**Thalictrum** [Tournefort *Inst.* 270, t. 143 (1700);] L. *Sp. Pl.* 545 (1753) et *Gen. Pl.* ed. 5, 242 (1754); Prantl in *Pflanzenfam.* iii, pt. ii, 61 et 66 (1891).

Perennial herbs. *Leaves* alternate, lower ones or all petioled; petioles more or less dilated and stipuloid at the base; laminae compound, leaflets small. *Inflorescence* usually compound, rarely simple. *Flowers* dioecious or imperfect, protogynous, often anemophilous. *Perianth* monochlamydeous, petaloid, almost hidden by the stamens; segments (in the British species) 4—5, imbricate in bud, small, caducous. *Nectar-leaves* absent. *Stamens* about 8—∞; filaments long, coloured, conspicuous; anthers elongate, projecting beyond the perianth, coloured, conspicuous; pollen usually only slightly viscous. *Carpels* 15—1, each with 1 pendulous ovule; style short or absent; stigma rather large, unilateral. *Fruit* an achene.

About 80 species; Europe; Asia; North America.

British series of *Thalictrum*

Series i. **Alpina** (see below). *Petioles* as long as the lamina. *Laminae* pinnate to bipinnate. *Inflorescence* simple or nearly so. *Pedicels* reflexed at and after anthesis. *Achenes* shortly stalked.

Series ii. **Minores** (p. 120). *Petioles* shorter than the laminae. *Laminae* tripinnate. *Inflorescence* compound. *Pedicels* not reflexed after flowering. *Flowers* more or less nodding. *Achenes* sessile.

Series iii. **Flava** (p. 122). *Petioles* of the lower leaves nearly as long as the laminae; stem-leaves sessile. *Inflorescence* compound, very dense-flowered. *Pedicels* not reflexed after flowering. *Flowers* erect. *Achenes* sessile.

Series i. *ALPINA*

**Alpina** nobis; *Homo-Thalictrum* Fries *Summa Veg. Scand.* 27 (1846) nomen.

For characters, see above. Only species:—*T. alpinum*.

## 1. THALICTRUM ALPINUM. Alpine Meadow-rue. Plate 117

*T. minimum montanum atrorubens foliis splendentibus* Lhwyd in Ray *Syn.* 62 (1690); ed. 2, 100 (1696); ed. 3, 204 (1724).

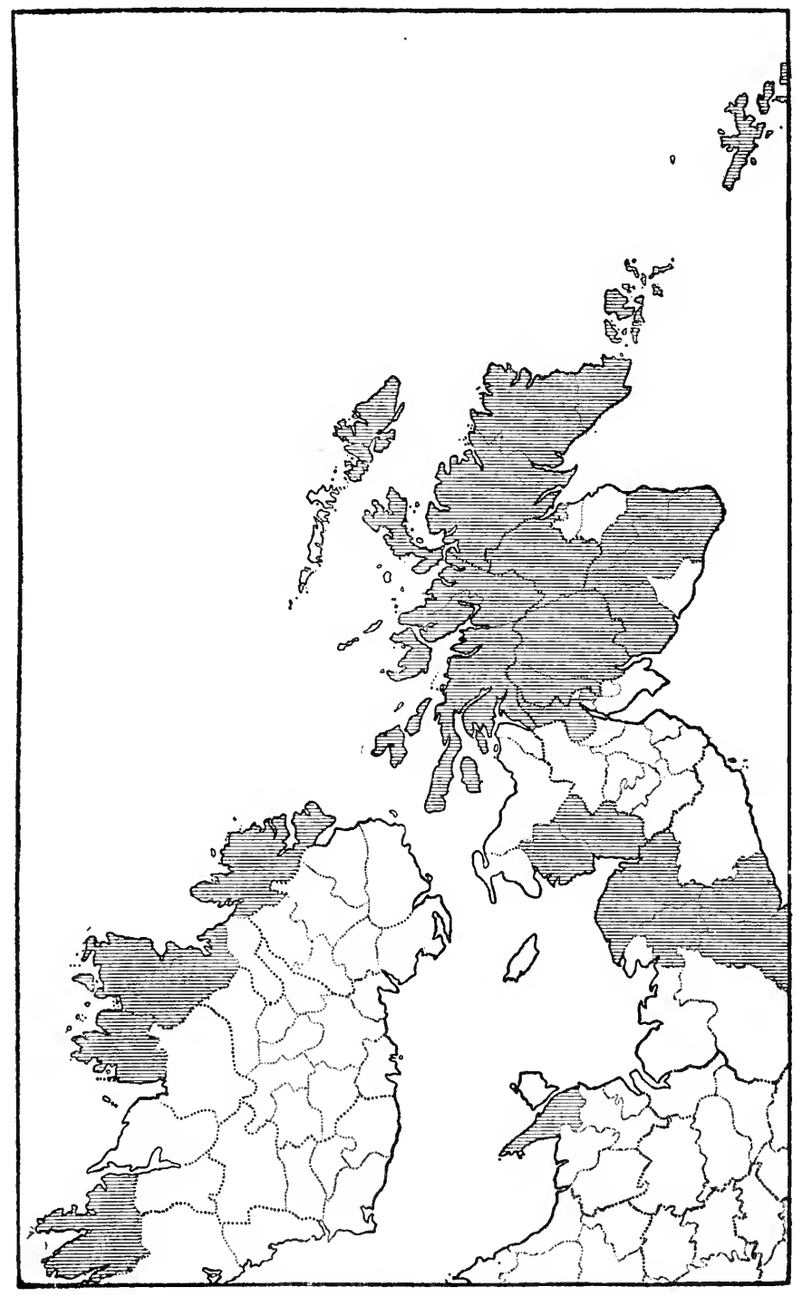
**Thalictrum alpinum** L. *Sp. Pl.* 545 (1753)!; Lightfoot *Fl. Scot.* i, 286, t. 13 (1777); Smith *Eng. Bot.* no. 262 (1795)!; *Fl. Brit.* 584 (1800); Syme *Eng. Bot.* i, 4 (1863); Rouy et Foucaud *Fl. France* i, 10 (1893).

Icones:—Smith *Eng. Bot.* t. 262; *Svensk Bot.* t. 655; *Fl. Dan.* t. 11; Reichenbach *Icon.* t. 26 (*Ranunc.*), fig. 4625; Syme *Eng. Bot.* i, t. 2.

*Camb. Brit. Fl.* iii. *Plate 117.* (*a*, *b*) Whole plants. *a*, from Cambridge Botanic Garden (R. I. L.). *b*, from Perthshire (E. S. M.).

Exsiccata:—Andersson (*Fl. Lapp.*), 84; Billot, 1601; Bourgeau (*Pyr. Esp.*), 80; Dickson, xviii, 6; Don, 15; Fries, iii, 27; Reichenbach, 1980; Schultz et Winter (*H. N.*), i, 2; *Fl. Austr.-Hung.*, 2561; *Pl. Braem.* 1.

Perennial; the smallest species of the genus, about 5—20 cm. high. *Rhizome* slender. *Shoot* glabrous. *Leaves* all petioled; petioles as long as or rather longer than the laminae; laminae bipinnate; pinnae often ternate; lobes of the pinnae 3-fid to 5-fid, obtuse, shiny and usually dark-coloured above, subglaucous underneath, often purplish; lateral lobes about as long as or a little longer than broad, up to about 5—7 mm. broad. *Inflorescence* simple, lax-flowered. *Bracts* small. *Bracteoles* absent. *Pedicels* reflexed before and after flowering. *Sepals* 4, pale yellow, acute. *Stamens* about 8—10; anthers oblong, not apiculate. *Achenes* subsessile or shortly stalked.



Map 47. Distribution of *Thalictrum alpinum* in the British Islands

Not uncommon locally in Alpine and sub-Alpine situations, chiefly on damp rocks and peat-moors; Wales—Carnarvonshire; north of England—northern Pennines and the Lake District; Scotland—rare in the south, rather common elsewhere; Ireland—local in the west, from co. Kerry to co. Donegal.

Faeröes, Iceland, Scandinavia, and Arctic and sub-Arctic Europe generally, mountains of central Europe generally, Pyrenees; Asia; North America (including Greenland).

### Series ii. *Minores*

**Minores** nobis.

The British forms of *T. minus* and its immediate allies have never been placed on a satisfactory basis, though Babington made several attempts to do this. Syme's account is unsatisfactory, and his illustrations very confusing. N. E. Brown's work (*Eng. Bot.* ed. 3, suppl.) is most careful and accurate; and we follow his lead in many points. Our own account must not be regarded as in any way approaching finality, although we have examined the specimens at Kew, the British Museum (Natural History), Cambridge, and some private collections, and collected plants in many parts of the British Isles. We believe there are several British forms which yet await identification. Rouy and Foucaud (*op. cit.*) name over 50 forms for France. We do not expect our own country to be so rich in *Thalictra* as France with its forms of central Europe, the western Alps, and the Mediterranean; but some of our forms do not seem to have been described or, at least, do not seem to be well understood. Among these is the plant we identify as *T. elatum* Jacquin.

The characters of the fruit are unfortunately frequently obscured by the presence of insect-galls.

Probably hybrids are numerous in localities where more than one form occurs. In some species (e.g., in *T. purpurascens*, a continental species), apogamy or pseudo-parthenogenesis has been proved to occur (see Overton in *Bot. Gaz.* xxxiii, 363–375 (1902)); and this may complicate matters, as in the case of *Hieracium* (see Ostenfeld in *New Phytol.* xi, 347 (1912)) and *Taraxacum*.

For characters, see page 119.

#### British species of *Minores*

2. **T. minus** (see below). *Lateral leaflets* usually longer than broad, often about 1·2 cm. long and 1·0 cm. broad. *Inflorescence* rather dense-flowered. *Peduncles* rather divaricate or more or less ascending, not reflexed in fruit. *Pedicels* rather short (often about 1·0—1·5 cm. long in fruit). *Achenes* broadly or narrowly elliptical.

3. **T. majus** (p. 121). *Lateral leaflets* either a little longer than broad or about as long as broad, often about 1·5—1·7 broad. *Inflorescence* lax-flowered. *Peduncles* divaricate. *Pedicels* rather long (up to about 2 cm. in fruit). *Achenes* broadly or narrowly elliptical.

4. **T. elatum** (p. 122). *Lateral leaflets* usually broader than long, often about 3 cm. broad. *Inflorescence* very lax, few-flowered. *Peduncles* divaricate or ascending. *Pedicels* long (up to 2·0—2·5 cm. in fruit). *Achenes* broadly elliptical.

## 2. THALICTRUM MINUS. Common Meadow-rue. Plates 118, 119, 120

*T. minus* Gerard *Herball* 1067 (1597); Ray *Cat. Cantab.* 162 (1660); *Syn.* ed. 3, 203 (1724).

**Thalictrum minus** L. *Sp. Pl.* 546 (1753); Smith *Eng. Bot.* no. 11 (1791); *Fl. Brit.* 584 (1800); Rouy et Foucaud *Fl. France* i, 11 (1893).

Perennial. *Rhizome* of variable length. *Shoots* glandular or not, usually glabrous, up to about 3 dm. high. *Stem* grooved, more or less zigzag. *Petioles* shorter than the laminae. *Laminae* tripinnate; pinnae stalked; segments of the pinnae sessile or nearly so, subcordate to cuneate at the base, more or less glaucous underneath, lateral ones usually longer than broad and often about 1·2 cm. long and 1·0 broad. *Inflorescence* many-flowered. *Peduncles* spreading to ascending, not bending over after flowering as in *T. alpinum*. *Pedicels* rather short, often about 1·0—1·5 cm. long in fruit. *Flowers* nodding; late May to early August. *Anthers* apiculate. *Sepals* 4. *Achenes* sessile, either broadly or narrowly elliptical, furrowed, 4—7 in each head.

(*a*) **T. minus** var. **vulgaris** nobis; *T. kochi* Fries *Fl. Suec. Mant.* iii, 46 (1842).

Icones:—Smith *Eng. Bot.* t. 11, as *T. minus*; *Fl. Dan.* t. 732; Jacquin *Fl. Austr.* t. 419; Reichenbach *Icon.* iii, t. 27 (Ranunc.).

*Camb. Brit. Fl.* iii. *Plate 118.* (*a*) Leaf. (*b*) Portion of stem (enlarged). (*c*) Portion of leaf (enlarged). (*d*) Inflorescence. (*e*) Head of achenes (enlarged). (*f*) Achenes (enlarged). Cambridgeshire (E. F. L.).

*Plate 119.* (*a*) Leaf. (*b*) Inflorescence. (*c*) Stamen (enlarged). (*d*) Ovary (enlarged). (*e*) Heads of achenes. (*f*) Achenes (enlarged). Somerset (L. V.).

Exsiccata :—Fries, vii, 25, as *T. collinum*; Huter, 1139, as *T. pubescens*; Reichenbach, 690, as *T. flexuosum*; t. 691, as *T. collinum*; Wirtgen, xvii, 944, as *T. minus*.

The plate (t. 7) in Syme's *Eng. Bot.*, vol. i, named *T. saxatile* is interesting. It is one of the new plates[1] specially prepared for *Eng. Bot.* ed. 3, and named *T. saxatile*. *T. saxatile* was by error given as a British plant by Babington in 1860 (*Fl. Camb.* p. 299). Babington here speculates regarding this plant—"if I am correct in believing that its flowers do not nod and that its carpels are nearly exactly oval..."; but, we may add, its flowers do nod and its carpels are elliptical. However, in the plate above cited, Syme supplies a figure which answers to Babington's speculations, but which is unlike any known British plant. Curiously, whilst Syme's figure is made to bear the erect flowers of the real *T. saxatile*, Syme queries this character in his description of the British plant. After many statements on the matter, Babington (in *Bot. Exch. Club Brit. Is. Rep. for 1885*, p. 122, and *Rep. for 1890*, p. 282) withdrew the name *T. saxatile* altogether.

Usually a larger plant than var. *dunense*. *Inflorescence* less diffuse. *Peduncles* shorter.

Calcareous grassland and sand-dunes; this is the common form of the species.

Europe.

(*b*) **T. minus** var. **dunense** Babington *Man.* ed. 8, 4 (1881); *T. dunense* Dumortier *Fl. Belg.* 126 (1827); N. E. Brown in *Eng. Bot.* ed. 3, suppl. 1 (1892); *T. minus* Fries *Fl. Succ. Mant.* iii, 45 (1842)! sens. str., excl. syn.; Babington in *Ann. Nat. Hist.* ser. 2, xi, 266 (1853) partim; *T. minus* subsp. *dunense* race *dunense* Rouy et Foucaud *Fl. France* i, 22 (1893).

Icones :—*Camb. Brit. Fl.* iii. *Plate 120.* (*a*) Leaf. (*b—c*) Inflorescences. (*d*) Head of achenes (enlarged). *b*, from Devonshire (C. E. L.): *a*, *c*, and *d* from Orkney (M. S.).

Exsiccata :—Fries, vii, 23, as *T. minus*.

Usually a small plant compared with var. *vulgaris*. *Inflorescence* more diffuse. *Bracts* like small leaves. *Peduncles* longer. *Achenes* usually twice as long as broad.

In some ways this variety is a link connecting *T. minus* and *T. majus*.

Sand-dunes, widespread but rather local and apparently absent on the southern and eastern coasts northwards to Norfolk; from Devonshire and Lincolnshire (including Wales) northwards to Orkney.

Sweden, Finland, Germany, Belgium, France, central Europe, Russia.

Calcareous rocks and grassland, and sand-dunes; local, but widespread, in England and Ireland, rare in Wales and Scotland.

Throughout Europe, except northern and Arctic, ascending to 2450 m. in Switzerland.

## 3. THALICTRUM MAJUS. Large Meadow-rue. Plates 121, 122

*T. montanum minus foliis latioribus* Lhwyd in Ray *Syn.* ed. 3, 204 (1724).

**Thalictrum majus** Crantz *Fl. Austr.* fasc. ii, 80 (1763); Jacquin *Fl. Austr.* v, 9 (1778); Smith *Eng. Bot.* no. 611 (1799); *Fl. Brit.* 585 (1800); Koch in *Bot. Zeit.* 428 (1841); *Syn.* ed. 2, 4 (1843); N. E. Brown in *Eng. Bot.* ed. 3, suppl., 4 (1892) emend.

Closely allied to *T. minus*, differing from it in the following characters :—*Shoot* taller. *Leaflets* larger, lateral ones a little longer than broad, often about 1·5—1·7 broad. *Inflorescence* laxer and with fewer flowers. *Peduncles* divaricate. *Pedicels* longer (up to about 2—3 cm. long in fruit).

(*a*) **T. majus** var. **dumosum** Koch *Syn.* 4 (1837); *T. flexuosum* var. *dumosum* Fries *Fl. Succ. Mant.* iii, 47 (1842); *T. flexuosum* Babington in *Ann. Nat. Hist.* ser. 2, xi, 268 (1853) partim, non Bernhardi; *T. minus* subsp. *majus* Rouy et Foucaud *Fl. France* i, 16 (1893).

Icones :—Smith *Eng. Bot.* t. 611, as *T. majus*; Jacquin *Fl. Austr.* v, t. 420, as *T. majus*; Reichenbach *Icon.* iii, t. 30, fig. 4629, as *T. majus*.

[1] Such new plates are usually distinguishable at a glance, as they are without the number, placed at the bottom left hand corner, of the original plates. However, some plates without the original number are partly repeated from the 1st edition; and many plates which are distinguished by the original number have been so altered, especially as regards the enlargements, that they are virtually new. It will be seen therefore that the practice of some botanists in purporting to cite plates of *Eng. Bot.* ed. 1 from the original number reproduced on the plates in ed. 3 causes confusion.

*Camb. Brit. Fl.* iii. *Plate 121.* (*a*) Flowering branches. (*b*) Portion of peduncle (enlarged). (*c*) Stamens (enlarged). (*d*) Heads of achenes (one enlarged). (*e*) Achene (enlarged). Perthshire (E. S. M.).

Exsiccata :—Billot, 2402, as *T. majus.*

*Rhizome* short, stout. *Shoot* 2—5 dm. high. *Laminae* large, 3-pinnate; lobes of the leaflets usually truncate or subcordate at the base, terminal ones usually 3-lobed and acute. *Inflorescence* large, diffuse, leafy, branches ascending. *Pedicels* up to about 3 cm. long. *Flowers* more or less porrect. *Achenes* about twice as long as broad, about 5 or 6 mm. long.

Gravelly and rocky sides of streams in the north of England and Scotland.

Europe.

(*b*) **T. majus** var. **capillare** N. E. Brown in *Eng. Bot.* ed. 3, suppl., 4 (1892); *T. capillare* Reichenbach *Fl. Germ. Excurs.* 729 (1832); *Icon.* iii, 15 (1838–9); *T. flexuosum* Babington *loc. cit.*, partim non Bernhardi nec Reichenbach.

Icones :—Reichenbach *Icon.* t. 36, fig. 4634, as *T. capillare.*

*Camb. Brit. Fl.* iii. *Plate 122.* (*a*) Leaf. (*b*) Inflorescence. (*c*) Portion of petiole. (*d*) Head of achenes. (*e*) *Achenes* (enlarged). Perthshire (W. R. L.).

*Shoot* as in var. *dumosum. Laminae* 3- to 4-pinnate; ultimate leaflets subcordate at the base, terminal one 3-lobed, each lobe 2-fid or 3-fid, obtuse, often apiculate; rather larger and thinner than in var. *dumosum. Inflorescence* as in var. *dumosum. Peduncles* long (up to 6 or 7 cm.) and capillary. *Pedicels* and *flowers* as in var. *dumosum. Achenes* about 1½ times as long as broad, about 3—5 cm. long.

Banks of lakes and streams; Perthshire, and perhaps elsewhere.

Central Europe.

Gravelly and rocky banks of streams and lakes; Wales, northern England, Scotland.

Germany, France, central Europe, southern Russia, south-eastern Europe.

## 4. THALICTRUM ELATUM. Tall Meadow-rue. Plate 123

**Thalictrum elatum** Jacquin *Hort. Vindob.* iii, 49, t. 95 (1776)!; Wallroth *Sched. Crit.* 260 (1822)?; Koch *Syn.* 5 (1835)?; nec Nyman *Consp.* 5 (1878); nec Reichenbach *Icon.* iii (*Ranunc.*), t. 35, fig. 4633.

Icones :—Jacquin *Hort. Vindob.* iii, t. 95.

*Camb. Brit. Fl.* iii. *Plate 123.* (*a*) Leaf. (*b*) Inflorescence. (*c*) Stamens (enlarged). (*d*) Heads of achenes (two enlarged). (*e*) Achene (enlarged). Perthshire (E. S. M.).

Perennial. *Shoot* up to 8—14 dm. high. *Petioles* about as long as the lower leaflets. *Laminae* tri- or bipinnate; pinnae with long (ca. 2 cm.) stalks; pinnules large (up to about 3 cm. broad and 2 long), more or less remote, often cordate at the base and asymmetrical, margin coarsely and irregularly 3- to 7-crenate, usually very obtuse, usually dark green above, subglaucous underneath. *Inflorescence* variable in size, branches rather remote, diffuse, rather divaricate. *Pedicels* up to about 2.5 cm. long. *Flowers* more or less porrect. *Anthers* slightly apiculate. *Achenes* relatively small, elliptical.

We find ourselves unable to escape from the conclusion that the plant of our Plate 123 is the *T. elatum* of Jacquin, as judged by his description, his illustration, and his specimen (in *Herb. Mus. Brit.*), though we doubt its being the *T. elatum* of recent continental authorities (vide *Rep. Watson Bot. Exch. Club* ii, 426 (1915)). We have long been familiar with it as a native of the shores of the lakes in the Lake District and in Scotland. It seems to us to be the most distinct of the plants we include in the series *Minores*; but we do not know whether or not it has been proved to remain constant in cultivation. N. E. Brown (*loc. cit.*) indicated that *T. elatum* Jacquin was probably a British plant.

Local; gravelly margins of lakes and brooks in the north of England and in Scotland; ?Wales, North Riding of Yorkshire, Durham, the Lake District (e.g., Cumberland), Perthshire, and perhaps elsewhere.

[We have seen no foreign material except Jacquin's original specimens which are of garden origin.]

### Series iii. *FLAVA*

**Flava** nobis. For characters, see page 119. Only British species :—*T. flavum.*

## 5. THALICTRUM FLAVUM. Marsh Meadow-rue. Plate 124

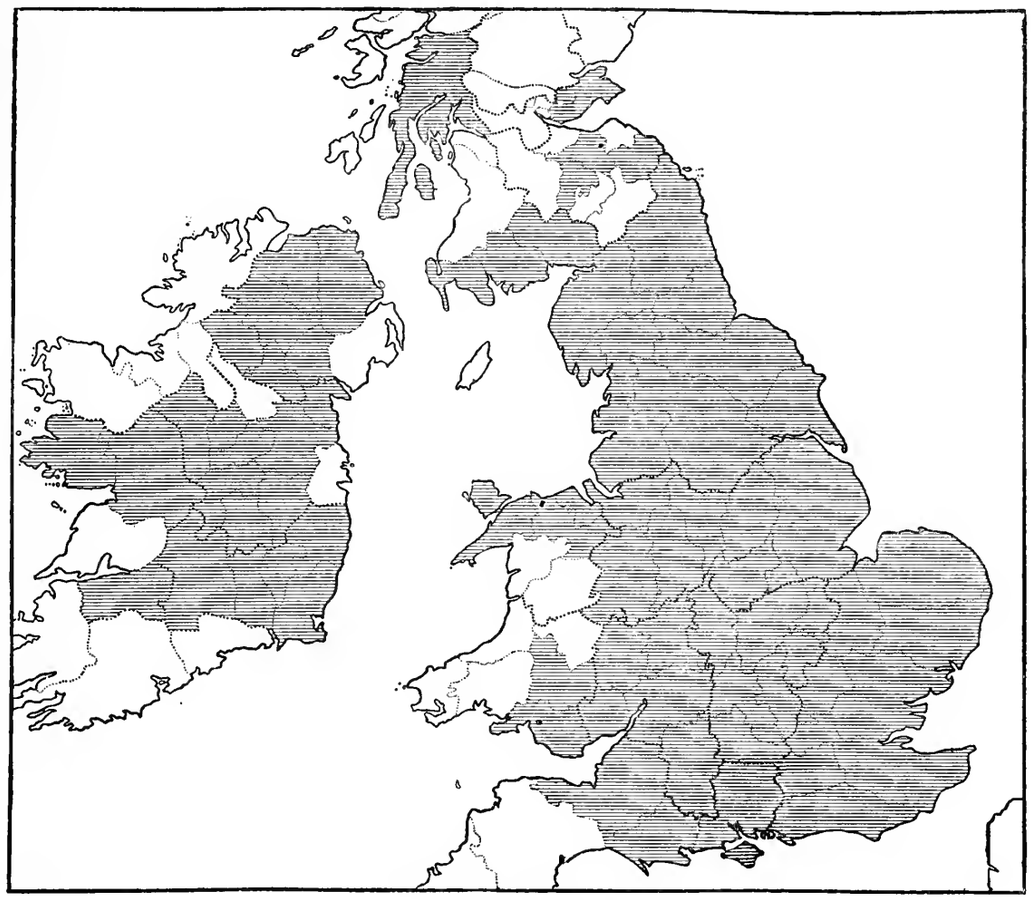
*T. seu Thalictrum majus* Gerard *Herball* 1067 (1597); Ray *Syn.* ed. 3, 203 (1724).

**Thalictrum flavum** L. *Sp. Pl.* 546 (1753)!; Smith *Eng. Bot.* no. 367 (1797)!; *Fl. Brit.* 585 (1800); Syme *Eng. Bot.* i, 9 (1863); Rouy et Foucaud *Fl. France* i, 31 (1893).

Icones :—Smith *Eng. Bot.* t. 367; *Fl. Dan.* t. 939; *Sv. Bot.* t. 328; Reichenbach *Icon.* iii, t. 43, fig. 4638, as *T. nigricans*; t. 44, fig. 4639; t. 45, fig. 4640, as *T. morisoni.*

*Camb. Brit. Fl.* iii. *Plate 124.* (*a*) Stem-leaf. (*b*) Upper portion of plant. (*c*) Heads of achenes (one enlarged). (*d*) Achenes (one enlarged). (*e*) Achenes infested by insect-larvae (two enlarged). Huntingdonshire (R. S. A.).

Exsiccata :—Billot, 2602; Ehrhart (*Pl. Off.*), 356, as *T. flavum*; Fries, ix, 25; Reichenbach, 692, as *T. nigricans* (with very narrow leaf-lobes); Wirtgen, x, 544; *Herb. Fl. Ingric.*, i, 4.



Map 48. Distribution of *Thalictrum flavum* in the British Islands

Perennial. *Rhizome* creeping. *Shoot* up to 1·2 m. high. *Petioles* of the lower leaves as long as the laminae. *Laminae* bipinnate; lobes of the pinnae sessile, cuneate at the base, 3—5 lobed at the apex, lateral ones much longer than broad; lobules obtuse. *Inflorescence* compound, crowded with flowers. *Peduncles* ascending at a rather narrow angle. *Bracts*—lower ones leaf-like. *Pedicels* short (up to about 1 cm. long in fruit). *Flowers* erect; July. *Anthers* not apiculate. *Achenes* 1·5—2·0 times as long as broad.

The drawing of our Plate 124 seems to conform to *T. morisoni* Reichenbach (*Icon.* iii, t. 45, fig. 4640), on account of its narrow fruit. Forms with shorter and relatively broader achenes are also British, and are *T. flavum* Reichenbach (*op. cit.* fig. 4639). Intermediate fruit-forms occur (cf. Syme *op. cit.* p. 9, et t. 8). There is also great variability in the species regarding the size of the inflorescence; but Mr J. Groves and Mr W. H. Beeby (*Bot. Exch. Club Brit. Is. Rep. for 1895*, 466) both agree that the shape of the inflorescence and fruit do not always go together.

Fens and river-banks, locally abundant; confined to soils where both the water-content and the mineral-content are high, chiefly in low-lying lands; from Dorset and Kent northwards to Argyllshire and Fifeshire; Ireland—chiefly in the central plain.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, south-eastern Europe.

Subtribe VII. *MYOSURINAE*

**Myosurinae** nobis; *Myosuroïdeae* Grenier et Godron *Fl. France* i, 17 (1848); Rouy et Foucaud *Fl. France* i, 55 (1893).

For characters, see page 114. Only British genus:—*Myosurus*.

## Genus 12. Myosurus

**Myosurus** [Dillenius *App. Cat. Giss.* 106 (1719);] L. *Sp. Pl.* 284 (1753) et *Gen. Pl.* ed. 5, 137 (1754); Prantl *Pflanzenfam.* iii, part 2, 61 et 63 (1891).

Small annual herbs. *Leaves* all radicle; petioles gradually merging into the laminae; laminae simple, linear, entire. *Sepals* coloured, 5—7, usually 5, each prolonged into a narrow spur at the base. *Petals* or *nectar-leaves* linear, consisting of a stalk below and a tube above, as many as the sepals or rarely absent. *Receptacle* greatly elongating in fruit. *Stamens* few. *Achenes* very numerous, densely packed, small, persistent.

7 species; temperate zones.

### 1. MYOSURUS MINIMUS. Mouse-tail. Plate 125

*Cauda muris* Gerard *Herball* 345 (1597); *Myosurus* Ray *Syn.* ed. 3, 251 (1724).

**Myosurus minimus** L. *Sp. Pl.* 284 (1753); Smith *Eng. Bot.* no. 435 (1797); *Fl. Brit.* 348 (1800); Syme *Eng. Bot.* i, 15 (1863); Rouy et Foucaud *Fl. France* i, 56 (1893).

Map 49. Distribution of *Myosurus minimus* in England and Wales

Icones:—Smith *Eng. Bot.* t. 435; Curtis *Fl. Lond.* ii, t. 70; *Fl. Dan.* t. 406; Reichenbach *Icon.* iii, t. 1, fig. 4659.

*Camb. Brit. Fl.* iii. *Plate 125.* (*a*, *b*) Plants in flower. Larger plants (*c*) in flower, and (*d*) in fruit. (*e*) Flower of plant *a* (enlarged). (*f*) Sepals (one enlarged), (*g*) petal (enlarged), and (*h*) stamens (one enlarged) of plant *c*. *a* and *b* from Huntingdonshire (E. W. H.). *c* from Worcestershire (R. F. T.). *d* from Cambridgeshire (C. E. M.).

Exsiccata:—Billot, 703; v. Heurck, iii, 145; E. et A. Huet, 2, as *M. minimus* var. *major*; Thielens et Devos, iv, 302; Todaro, 250; *Herb. Fl. Ingric.*, vii, 11.

An ephemeral annual plant. *Shoot* up to about 13 cm. high when in fruit, glabrous. *Leaves* very narrowly spathulate, about 1—3 cm. long and 1 mm. broad. *Flowers* about 4—8 mm. in diameter; May. *Sepals* yellow, with claw and limb, limb about 3—5 mm. long and 1 broad, claw appressed against the pedicel. *Petals* or *nectar-leaves* greenish-yellow, very narrow (less than 1 mm.). *Stamens* about 5, about as long as the petals. *Fruit* up to about 5 cm. long. *Achenes* very numerous, 200—300, brown, ripe in July.

Rather damp cornfields, and on alluvial ground, on light, sandy, and gravelly soils; a lowland plant, occurring from Dorset and Kent northwards to Carnarvonshire, Flintshire, Cheshire, and Northumberland. Not in Scotland or Ireland.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, local in southern Europe; northern Africa; south-western Asia; North America.

Subtribe VIII. *RANUNCULINAE*

**Ranunculinae** nobis non Bernhardi; *Ranunculeae* DC. *Syst. Nat.* i, 25 (1818) excl. *Myosurus*; Grenier et Godron *Fl. France* i, 18 (1848); Rouy et Foucaud *Fl. France* i, 56 (1893).

For characters, see page 114. Only British genus:—*Ranunculus*.

## Genus 13. Ranunculus

**Ranunculus** [Tournefort *Inst.* 285, t. 149 (1700);] L. *Sp. Pl.* 548 (1753) et *Gen. Pl.* ed. 5, 243 (1754); Prantl in *Pflanzenfam.* iii, pt. 2, 61 et 64 (1891).

Herbs, annual or perennial, usually acrid. *Leaves* mostly spiral; base with or without a stipuloid sheath; laminae entire or more or less deeply lobed, lobes often in 3's and sometimes much dissected. *Inflorescence* cymose. *Thalamus* conspicuous, often more or less elongate. *Sepals* 3—6, usually 5, often more or less caducous. *Nectar-leaves* or *petals* 5—12, usually 5, yellow or white, nectar secreted in a basal pit which is either naked or covered by a scale, expanded into a petal or petal-like limb. *Stamens* usually ∞, anthers extrorse. *Ovaries* usually ∞, apocarpous. *Style* very short. *Ovules* 1 in each ovary. *Fruit* a subspherical or cylindrical group of achenes; achenes usually ∞, more or less beaked.

[In addition to the 22 British species of *Ranunculus* described in this work, the two following have also been recorded as British.

**Ranunculus gramineus** L. *Sp. Pl.* 549 (1753); Smith *Eng. Bot.* t. 2306 (1811). This has linear leaves, few and large flowers about 3 cm. in diameter, and yellow petals. Withering *Bot. arr.* ed. 3, vol. ii, 505 (1796), records it for Wales, on the authority of a Mr Pritchard. The record is probably erroneous.

**Ranunculus alpestris** L. *Sp. Pl.* 553 (1753); Smith in *Trans. Linn. Soc.* x, 343 (1811); *Eng. Bot.* t. 2390 (1812). This has solitary flowers about 2·2 cm. in diameter and white petals. Smith states that it was "gathered by Mr G. Don by the sides of little rills and in other moist places, about two or three rocks on the mountain of Clova.... Mr Don informs us that it rarely produces flowers where he observed it, and that the plant is not plentiful" (*Eng. Bot.* no. 2390). There is a specimen in herb. Smith in the rooms of the Linnaean Society of London with the following inscription:—"By little rills among rocks on the mountain of Clova, Angusshire, seldom flowering: G. Don, Apr. 3, 1809." The record appears not to have ever been confirmed; but it is very circumstantial.]

About 250 species; cosmopolitan.

### British sections of *Ranunculus*

Section I. **Ficaria** (see below). Perennial geophytes. *Leaves* petioled; petioles with a basal sheath; laminae simple, cordate; stem-leaves (when present) opposite. *Sepals* 3—6, usually 3. *Petals* or nectar-leaves 6—12, usually 7—9, yellow, basal nectary covered with a scale. *Achenes* inflated.

Section II. **Flammula** (p. 126). Perennial or annual. *Laminae* simple, mostly more or less elongate, entire or merely dentate. *Petals* 5, yellow; nectary covered by a scale. *Achenes* compressed or not, pitted or granulate.

Section III. **Eu-Ranunculus** (p. 129). Perennial or annual. *Laminae* palmatipartite. *Petals* 5, yellow, nectary usually covered by a scale (but cf. *R. auricomus*). *Receptacle* sometimes elongate. *Achenes* usually compressed, bordered, keeled.

Section IV. **Hecatonia** (p. 137). Annual. *Laminae* 3-lobed or 3-partite. *Petals* yellow, nectary naked. *Receptacle* markedly elongate. *Achenes* compressed, bordered, keeled.

Section V. **Batrachium** (p. 138). Aquatic or mud-plants, perennial (? rarely annual). *Laminae* either (1) all floating, with 3—5 lobes or divisions, or (2) all submerged, segments numerous and capillary, or (3) some floating and some submerged. *Pedicels* more or less recurved at maturity. *Flowers* protandrous. *Receptacle* subglobose or somewhat elongate. *Petals* usually 5, rarely 6—9, white, with usually a yellow base, nectary naked. *Achenes* turgid, not margined, transversely wrinkled.

## Section I. *FICARIA*

**Ficaria** [Dillenius *App. Cat. Giss.* 108 (1719) as a genus;] Hudson *Fl. Angl.* 213 (1762) as a genus; Boissier *Fl. Orient.* i, 20 (1867); Rouy et Foucaud *Fl. France* i, 72 (1893).

For characters, see above. Only British species:—*R. ficaria.*

### 1. RANUNCULUS FICARIA. Pilewort or Lesser Celandine. **Plates 126, 127, 128**

*Chelidonium minus* Turner *Names* D v (1548); Gerard *Herball* 669 (1597); Ray *Syn.* ed. 3, 246 (1724).

**Ranunculus ficaria** L. *Sp. Pl.* 550 (1753)!; Smith *Fl. Brit.* 589 (1800); Syme *Eng. Bot.* i, 47 (1863); Rouy et Foucaud *Fl. France* i, 72 (1893); *Ficaria verna* Hudson *Fl. Angl.* 214 (1762).

Icones:—Smith *Eng. Bot.* t. 584; Curtis *Fl. Lond.* i, 110; Martyn *Fl. Rust.* t. 21; *Fl. Dan.* t. 499; *Sv. Bot.* t. 17; Reichenbach *Icon.* iii, t. 1, fig. 4571, as *Ficaria calthaefolia* et fig. 4572, as *F. ranunculoïdes*; Syme *Eng. Bot.* i, t. 39, as *R.* [*ficaria* subsp.] *eu-ficaria.*

*Camb. Brit. Fl.* iii. *Plate 126.* (*a*) Plant in flower. (*b*) Leaf. Worcestershire (S. H. B.). *Plate 127.* (*a*) Lower part of plant. (*b*) Leaves. (*c*) Terminal part of inflorescence. (*d*) Flowers. (*e*) Ripening fruit. (*f*) Mature fruit. (*g*) Achenes (two enlarged). Huntingdonshire (E. W. H.).

Exsiccata:—Billot, 208; Schultz (*H. N.*), i, 4, as *R. ficaria* var. *parviflorus* forma *incumbens*; vii, 4 bis, as *R. ficaria* var. *incumbens*; Todaro, 1376; *Herb. Fl. Ingric.* i, 22.

A perennial geophyte. *Roots*—some fibrous, some tuberous; tubers with a bud at the apex, which gives rise to new plants. *Shoot* (in forma *luxurians*) up to 3 dm. high. *Petioles* of the lower leaves several times longer than the laminae, with sheathing bases. *Laminae* cordiform, more or less cordate at the base, basal lobes diverging to overlapping, margin subentire to irregularly crenate, apex obtuse, up to about 2·5—5·0 cm. long and 3—8 broad. *Bracts* leaf-like, in opposite pairs, supernumerary alternate ones sometimes above, sometimes with tubers in the axils. *Inflorescence* a trifarious cyme. *Pedicels* grooved, long (up to 1·5 dm. in forma *luxurians*). *Receptacle* glabrous. *Flowers* up to 3·0—3·5 cm. in diameter; February to May. *Sepals* 3—4, yellowish-green, somewhat scarious. *Nectar-leaves* or *petals* about 6—10, usually 7—8, greenish on the outside, golden yellow on the inside. *Stamens* ∞. *Achenes* about 15—20, somewhat hairy, up to 4—5 mm. long and 2—3 broad, often not formed.

Our Plate 126 represents the so-called var. *incumbens*, and Plate 127 the so-called var. *decumbens*: the difference between the two is seen in the basal lobes of the laminae, and seems to be due to soil-conditions.

(*β*) forma **luxurians** nobis.

Icones:—*Camb. Brit. Fl.* iii. *Plate 128.* (*a*) Portion of a plant in flower. (*b*) Leaves. (*c*) Fruiting branch. (*d*) Achenes (three enlarged). Jersey (S. G.).

Larger than the common form in all its parts. *Shoot* up to 3 dm. high. *Aërial* stem up to 5 mm. in diameter. *Petioles* of the lower leaves about 1·0—2·5 dm. long, basal sheaths very large. *Laminae* up to 5·0 cm. long (excluding the basal lobes) and 8 broad. *Pedicels* up to 1·5 dm. in diameter. *Achenes* about 4—5 mm. long and 2—3 broad.

Damp places in shady lanes and orchards near St Aubyn, Jersey, and probably elsewhere.

Very common; damp woods, hedgerows, stream-sides, and grassland, and as a weed in damp gardens; throughout the British Isles, ascending to 730 m. in Wales.

Europe (except the Arctic region), ascending to 1630 m. in the Tyrol; south-western Asia; North America (not indigenous).

## Section II. *FLAMMULA*

**Flammula** [Webb ex] Spach *Hist. Nat. Veg. Phanerog.* vii, 208 (1839) as a subgenus; Rouy et Foucaud *Fl. France* i, 82 (1893); cf. *Flammulae* Prantl in Engler's *Bot. Jahrb.* ix, 267 (1888).

For characters, see page 125.

### British species of *Flammula*

2. **R. lingua** (see below). Perennial. *Laminae* of aerial leaves rather acuminate. *Pedicels* not grooved. *Flowers* large (about 3—4 cm. in diameter). *Achenes* compressed, smooth, beak broad.

3. **R. flammula** (p. 128). Perennial. *Laminae* acute or rather obtuse. *Pedicels* grooved. *Flowers* small (up to about 2 cm. in diameter). *Achenes* inflated, smooth, beak narrow.

4. **R. ophioglossifolius** (p. 129). Biennial or ? perennial. *Laminae* of lower leaves subor-bicular, of the upper ones rather acute. *Pedicels* grooved. *Flowers* small, about 0·5—1·3 cm. in diameter. *Achenes* compressed, tuberculate, beak rudimentary.

## 2. RANUNCULUS LINGUA. Greater Spearwort. Plate 129

*R. flammeus major* Gerard *Herball* 814 (1597); Johnson *Kent* 31 (1632); Ray *Syn.* ed. 3, 250 (1724).

**Ranunculus lingua** L. *Sp. Pl.* 549 (1753)!; Smith *Eng. Bot.* no. 100 (1793)!; *Fl. Brit.* 588 (1800); Syme *Eng. Bot.* i, 35 (1863); Rouy *Fl. France* i, 82 (1893).

Icones:—Smith *Eng. Bot.* t. 100; *Fl. Dan.* t. 755; Reichenbach *Icon.* iii, t. x, fig. 4595 (right-hand figure). (All three figures belong to the var. *hirsutus* Wallroth *loc. cit.*) Roper in *Journ. Linn. Soc.* xxi, t. 13 (submerged leaves).

*Camb. Brit. Fl.* iii. *Plate 129.* (*a*) Lower part of plant. (*b, c, d*) Portions of stem. (*e, f*) Uppermost portions of stems in flower and fruit. (*g*) Achenes (two enlarged). Cambridgeshire (C. E. M.).

Exsiccata:—Billot, 1104; Don, 115; Reichenbach, 1775; *Herb. Fl. Ingric.* vi, 14.

Perennial, aquatic or subaquatic herb, with rhizome. *Submerged leaves* with petioles about 10—12 cm. long; laminae ovate to oblong-ovate, cordate at the base, margin often rather wavy, apex obtuse, about 17 to 23 cm. long, usually disappearing before the flowering season begins. *Aërial stem* erect, hollow, glabrous or pubescent, 0·5—1·5 m. high. *Aërial leaves* persistent, sessile; *laminae* linear-lanceolate, more or less amplexicaul at the base, subentire, acuminate, up to about 25 cm. long and from 1·0—3·7 broad. *Inflorescence* with about 2—3 flowers. *Pedicels* grooved. *Flowers* up to about 4 cm. in diameter; June to August. *Sepals* hairy. *Petals* golden yellow, 3—4 times as long as the sepals. *Achenes* compressed, very numerous, margined, with a prominent beak.

We have not noticed any glabrous form (*R. lingua* var. *glabratus* Wallroth *Sched. Crit.* 288 (1822)) in this country where the plants conform to *R. lingua* var. *hirsutus* Wallroth *loc. cit.*

Map 50. Distribution of *R. lingua* in the British Isles

Local; borders of lakes, ponds, and ditches, in places which are inundated at least in winter and early spring, and where the mineral-content of the water is high or fairly high; from the Channel Isles, Cornwall, and Kent, northwards to Ross-shire; widely distributed in Ireland.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia. rare in southern Europe; Asia.

### 3. RANUNCULUS FLAMMULA. Lesser Spearwort. Plates 130, 131, 132

*Flammula* Turner *Names* H iii (1548); *R. flammeus minor* Gerard *Herball* 814 (1597) incl. *R. flammeus serratus*; Ray *Syn.* ed. 3, 250 (1724); *R. flammeus latiori plantaginis folio marginibus pilosis* Dillenius in Ray *Syn.* ed. 3, 251 (1724).

**Ranunculus flammula** L. *Sp. Pl.* 548 (1753)!; Smith *Eng. Bot.* no. 387 (1797)!; *Fl. Brit.* 587 (1800); Syme *Eng. Bot.* i, 33 (1863); Rouy et Foucaud *Fl. France* i, 82 (1893).

Perennial. *Stem* erect or decumbent, up to 40 cm. high, usually rooting at the base. *Ground leaves* sheathing at the base, petiolate, petioles usually about as long as the laminae; laminae elliptical or obovate, margin toothed or entire. *Upper leaves* sheathing at the base, sessile, narrowly ovate to linear, usually entire. *Pedicels* furrowed. *Receptacle* elongate. *Flowers* from 1 cm. or rather less to 2 cm. in diameter; May to September. *Scale of nectary* small. *Head of achenes* globose. *Achenes* glabrous or nearly so.

*R. flammula* is one of the most variable species in the British flora. Many of its forms seem to be due to habitat-conditions, to which the species is very responsive. Whether or not the following varieties are more than habitat-states (or *formae*) cannot, in the absence of cultural experiments, be stated.

(*a*) **R. flammula** var. **ovatus** Persoon *Syn.* ii, 102 (1807); *R. flammula* var. *serratus* DC. *Syst.* i, 247 (1818); Rouy et Foucaud *Fl. France* i, 83 (1893); *R. flammula* var. *latifolius* Wallroth *Sched. Crit.* 289 (1822) incl. var. *serratus*.

Icones:—*Camb. Brit. Fl.* iii. *Plate 130.* (*a*) Lower part and (*b*, *c*) upper part of shoot. (*d*) Receptacle (enlarged). (*e*) Achenes (enlarged). *b* from Jersey; *a*, *c*, *d*, and *e* from Cornwall (E. W. H.).

Whole plant more robust than in the other varieties. *Laminae* broad, margins more or less serrate. *Inflorescence* many-flowered. *Flowers* larger, often 2 cm. in diameter. *Achenes* relatively broader.

Jersey, Cornwall, and doubtless elsewhere in southern England; recorded, for example, for Surrey and Buckinghamshire (in *Bot. Exch. Club Brit. Is., Rep. for 1911*, p. 7).

France, and doubtless elsewhere.

(*b*) **R. flammula** var. **suberectus** comb. nov.; *R. flammula* subsp. *eu-flammula* var. *suberectus* Syme *Eng. Bot.* i, 34 (1863); *R. flammula* Rouy et Foucaud *loc. cit.*, excl. vars.

Icones:—Smith *Eng. Bot.* t. 387, as *R. flammula*; Curtis *Fl. Lond.* ii, t. 107, as *R. flammula*; *Fl. Dan.* t. 575, as *R. flammula*; Reichenbach *Icon.* t. 10, fig. 4945, as *R. flammula*.

Exsiccata:—Billot, 207, as *R. flammula*; Don, 113, as *R. flammula*; Wirtgen, ix, 730, as *R. flammula*; *Herb. Fl. Ingric.* i, 15, as *R. flammula*; Linn. herb., as *R. flammula*; Smith herb., as *R. flammula*.

*Stem* rooting at the lower nodes, more or less procumbent at the base, suberect to erect above. *Laminae* oval or narrowly oval, entire or only slightly serrate. *Inflorescence* few-flowered. *Flowers* about 1·5 cm. in diameter.

(*β*) var. **suberectus** forma **pseudo-reptans** comb. nov.; *R. flammula* var. *angustifolius* Wallroth *Sched. Crit.* 289 (1822) incl. var. *tenuifolius*; Rouy et Foucaud *Fl. France* i, 83 (1893); *R. flammula* subsp. *eu-flammula* var. *pseudo-reptans* Syme *loc. cit.*

This is a common state with a slender and often a procumbent stem which roots at the nodes, with narrow laminae, and with small flowers: it often occurs on barren and especially on acidic soils.

(*γ*) var. **suberectus** forma **submersus** comb. nov.; *R. flammula* forma *submersus* Glück *Biol. und Morph.*, iii *Die Uferflora* 495 (1911).

This is the deep-water state with narrowly elliptical laminae and apparently always barren.

(*δ*) var. **suberectus** forma **natans** comb. nov.; *R. flammula* forma *natans* Glück *op. cit.* p. 493.

This is the water-state with floating, oval laminae.

The var. *suberectus* is the most common form of the species.

(*c*) **R. flammula** var. **petiolaris** Lange in *Journ. Bot.* xxvii, 230 (1889); *R. petiolaris* Marshall in *Journ. Bot.* xxx, 289, t. 328 (1892) non Bonpland, Humboldt, and Kunth; *R. scoticus* Marshall in *Journ. Bot.* xxxvi, 103 (1898); in *Ann. Scot. Nat. Hist.* 122 (1898).

Icones:—*Camb. Brit. Fl.* iii. *Plate 131.* (*a*) Lower part and (*b*) upper part of flowering shoot. (*c*) Lower leaves of the same plant grown on until the following year. (*d*) Flower. (*e*) Petal (enlarged). (*f*) Head of achenes. (*g*) Achenes (three enlarged). Inverness-shire (E. S. M.).

*Ground-leaves* and lower stem-leaves with long petioles, laminae elliptical.

Possibly this ought to be reduced to a subvariety of var. *suberectus*. Mr Marshall's statement that the first leaves of this variety have linear laminae is not confirmed by growing the plant under cultural conditions: on the contrary, it seems to be the case that all members of the section *Flammula* possess first leaves with elliptical laminae.

The var. *petiolaris* is local in Scotland and Ireland on the shores of lochs, often on peaty moors; northwards at least to Inverness-shire and westwards to co. Mayo.

Not definitely known outside the British Islands, but "should occur in Scandinavia" (Rev. E. S. Marshall *in litt.*); "very probably occurs in Alpine lakes in Switzerland and Savoy (Professor Hugo Glück *in litt.*).

(*d*) **R. flammula** var. **reptans** Rouy et Foucaud *Fl. France* i, 83 (1893); *R. reptans* L. *Sp. Pl.* 549 (1753)!; Lightfoot *Fl. Scot.* i, 289 (1777); Wallroth *Sched. Crit.* 289 (1822); *R. flammula* var. δ Smith *Fl. Brit.* 586 (1800); *R. flammula* subsp. *reptans* Syme *Eng. Bot.* i, 34 (1863).

Icones:—Syme *Eng. Bot.* i, t. 30, as *R.* [*flammula* subsp.] *reptans*; *Fl. Dan.* t. 108, as *R. reptans*; Reichenbach *Icon.* t. 10 (*Ranunc.*), fig. 4945 β, as *R. flammula* var. *reptans*.

*Camb. Brit. Fl.* iii. *Plate 132.* (*a—d*) Plants in flower. (*e*) Head of achenes (enlarged). (*f*) Achenes (four enlarged). Ulleswater (S. H. B.).

Exsiccata:—Dickson, vi, 10; Don, 114; Fellman, 4; Fries, x, 27; Reichenbach, 1774; *Herb. Fl. Ingric.* i, 16.

*Stem* very slender, internodes arched, rooting and budding at the nodes. *Petioles* as long as or longer than the laminae. *Laminae* narrowly spathulate, small. *Flowers* variable in size. *Achene* with a rather definite beak.

The var. *reptans* occurs on gravelly margins of lakes in Westmorland, Cumberland, Kinross-shire, and Aberdeenshire.

Faeröes, Iceland, Scandinavia, Denmark, Germany, Holland, ?Belgium, France, central Europe (ascending to 1300 m.), Russia; North America.

Locally common; in marshes and fens and damp places generally, from the Channel Isles, Cornwall, and Kent northwards to Zetland; throughout Ireland.

Throughout Europe, ascending to 2180 m. in Switzerland; Asia; North America.

## 4. RANUNCULUS OPHIOGLOSSIFOLIUS. Plate 133

**Ranunculus ophioglossifolius** Villars *Hist. Pl. Dauph.* iii, 731, t. 49 (1789); Babington in *Eng. Bot. Suppl.* no. 2833 (1830); Syme *Eng. Bot.* i, 32 (1863); H. Groves in *Journ. Bot.* 51 (1883); Rouy et Foucaud *Fl. France* i, 83 (1893).

Icones:—Babington in *Eng. Bot. Suppl.* t. 2833; *Fl. Dan. Suppl.* iii, t. 147; Reichenbach *Icon.* iii, t. xxi, fig. 4613 (a small-flowered form).

*Camb. Brit. Fl.* iii. *Plate 133.* (*a*) Lower part and (*b*) upper part of plant. (*c*) Flowers. (*d*) Achenes (three enlarged). Gloucestershire (G. C. D.).

Exsiccata:—Billot, 907; Bourgeau (*Pl. Divers.*); (*Pl. d'Espagne*); A. Schultz (*Fl. Istr.*), 5; Todaro, 365.

? Biennial or perennial. *Shoot* 1—3 dm. high, erect. *Stem* hollow, rooting at the lowest nodes. *Lower stem-leaves* with very long (up to 15 cm.) petioles; laminae suborbicular-oval to oval, truncate to subcordate at the base, margin subentire, apex more or less obtuse, about 3 cm. long. *Upper stem-leaves* sessile or nearly so; laminae elliptical, cuneate at the base, subentire, rather obtuse. *Pedicels* about 4—6 cm. long in fruit. *Receptacle* glabrous. *Flowers* more numerous than in *R. flammula*, about 0·5—1·3 cm. in diameter; May and June. *Sepals* glabrous. *Petals* pale yellow, not or scarcely overlapping. *Stamens* small. *Achenes* in a globose head, compressed, with small tubercles and a few bristly hairs; beak rudimentary.

There appear to be two forms of this in Europe, a small-flowered and a large-flowered form. It is the latter which is reproduced in our Plate 133. The small-flowered form was drawn by Mr Hunnybun from Dorset; but we have not reproduced that drawing. Reichenbach's figure and the one in *Eng. Bot. Suppl.* illustrate the small-flowered plant.

Map 51. Distribution of *R. ophioglossifolius* in England

Very rare; in marshy places subject to floods in Jersey, Hampshire, Dorset, and Gloucestershire.

Southern Sweden (Gothland), ? Denmark, France, southern Europe; northern Africa; south-western Asia.

### Section III. *EU-RANUNCULUS*

**Eu-Ranunculus** Grenier et Godron *Fl. France* i, 29 (1847) incl. *Echinella* p. 41; Rouy et Foucaud *Fl. France* i, 91 (1893) incl. *Ranunculastrum* p. 86 et *Echinella* p. 111.

For characters, see page 125.

British species of *Eu-Ranunculus*

5. **R. flabellatus** (see below). *Root-tubers* present. *Pedicels* not furrowed. *Receptacle* glabrous. *Sepals* spreading. *Head of achenes* elongate. *Achenes* glabrous, punctulate; beak long, nearly straight.

6. **R. auricomus** (p. 131). *Pedicels* not furrowed. *Receptacle* glabrous. *Sepals* spreading. *Nectary* scaleless. *Head of achenes* subglobose. *Achenes* hairy; beak long, curved.

7. **R. repens** (p. 132). *Pedicels* furrowed. *Receptacle* slightly hairy. *Sepals* spreading. *Head of achenes* subglobose. *Achenes* glabrous; beak short.

8. **R. acris** (p. 132). *Pedicels* not furrowed. *Receptacle* glabrous. *Sepals* spreading. *Head of achenes* subglobose. *Achenes* glabrous; beak conspicuous, curved.

9. **R. bulbosus** (p. 134). *Root* swollen. *Pedicels* furrowed. *Receptacle* slightly hairy. *Sepals* reflexed. *Head of achenes* subglobose. *Achenes* glabrous; beak short, curved.

10. **R. aleae** (p. 134). Differs from *R. bulbosus* in the following characters. *Root* not or scarcely swollen. *Pedicels* less markedly grooved, especially towards the top. *Flowers* rather paler and larger. *Head of achenes* larger.

11. **R. sardoüs** (p. 135). Annual. *Pedicels* furrowed. *Receptacle* hairy. *Sepals* reflexed. *Head of achenes* subglobose. *Achenes* broad; beak straight, short.

12. **R. parviflorus** (p. 136). Annual. *Pedicels* furrowed. *Receptacle* glabrous. *Sepals* reflexed. *Head of achenes* subglobose. *Achenes* broad; beak short, nearly straight.

13. **R. arvensis** (p. 136). Annual. *Pedicels* not furrowed. *Receptacle* hairy. *Sepals* spreading. *Head of achenes* subglobose. *Achenes* prickly; beak rather long, curved.

## 5. RANUNCULUS FLABELLATUS. Plate 134

**Ranunculus flabellatus** Desfontaines *Fl. Atlant.* i, 438 (1798); N. E. Brown *Eng. Bot.* ed. 3, suppl., 16 (1892); Rouy et Foucaud *Fl. France* i, 88 (1893); *R. chaerophyllus* [L. *Sp. Pl.* 555 (1753) pro min. parte, excl. diagn., non herb.;] DC. *Syst. Nat.* i, 254 (1818); Trimen in *Journ. Bot.* x, 225 (1872).

Icones:—Desfontaines *Fl. Atlant.* t. 114; Trimen in *Journ. Bot.* x, t. 125, as *R. chaerophyllus*; N. E. Brown in *Eng. Bot.* ed. 3, suppl. t. 36 a.

*Camb. Brit. Fl.* iii. *Plate 134.* (*a*) Lower part of plant. (*b*) Ground-leaves. (*c*) Stem-leaves. (*d*) Flowering stems. (*e*) Petal. (*f*) Lower part of petal (enlarged). (*g*) Stamens (enlarged). (*h*) Achenes (two enlarged). Jersey (J. P. and S. G.).

Exsiccata:—Borgeau (*Pl. d'Espagne*), 527, et 2081; Huter (*Itin. Ital.* iii), 335.

Perennial. *Roots* consisting of long fibres and several small (about 8 mm. by 6) tubers. *Stolons* very slender, 7—12 cm. long, terminated by a bud which gives rise to a new plant. *Shoot* about 3 dm. high, not or little branched, hairy. *Rosette-leaves* dying early; petioles longer than the laminae; laminae simple, more or less deeply lobed, lobes obtuse. *Stem-leaves* few; basal-sheaths rather prominent; petioles much longer than the laminae; laminae with 3—5 lobes; lobes cuneate, each with 2—3 secondary lobes, acute to obtuse. *Inflorescence* with only 1—2 (rarely 3 or 4) flowers. *Pedicels* long (up to 16 cm.), not furrowed, striate when dry. *Receptacle* glabrous. *Flowers* about 2·5—3·5 cm. in diameter; late April and May. *Sepals* with a broad scarious margin, spreading, caducous, yellowish on the inner side. *Petals* yellow, large, nectary covered with an oblong or subrectangular scale. *Stamens* longer than the carpels; filaments broadening towards the top. *Carpels* ∞, crowded, style comparatively long (2 mm.). *Head of achenes* elongate, about 1·5—2·0 cm. long and 1·0 broad; achenes compressed, minutely punctate, brownish, margin greenish; beak nearly straight, long but shorter than the rest of the achene.

The specimen in the Linnaean herbarium named *R. chaerophyllus* is not the present species, but an imperfect example of some other plant. On the other hand, *R. bulbosus* Linn. herb. is *R. flabellatus* Villars[1].

According to Rouy and Foucaud (*op. cit.* p. 89), the Jersey plant is referable as follows:—*R. flabellatus* var. *acutilobus* Freyn in *Oest. Bot. Zeit.* xxvi, 128—129 (1876); *R. dimorphorhizus* Brotero *Phyt. Lusit.* ii, 227, t. 180 sinstr. (1827); *R. chaerophylloïdes* Jordan *Observ.* fragm. vi, 5 (1847); *R. flabellatus* race *dimorphorhizus* Rouy et Foucaud *op. cit.* p. 89.

Very rare; dry sandy, sunny hedgebanks in Jersey.

Belgium, France (including Normandy), Spain, Portugal, Italy, southern Austria (Dalmatia), Crete, Turkey, Greece; northern Africa; south-western Asia and India.

[1] "Valuable as that collection [the Linnaean herbarium] very often is, yet it is sometimes better to judge of what Linnaeus intended by an examination of his publications than his specimens. It would be productive of the greatest confusion, and no benefit, to adapt our nomenclature invariably to that of the Linnaean herbarium" (Trimen in *Journ. Bot.* x, 227–8 (1872)). We cannot imagine that any systematist who has freely consulted the herbarium of Linnaeus will dissent from this carefully expressed opinion of Dr Trimen.

## 6. RANUNCULUS AURICOMUS. Goldilocks. Plate 135

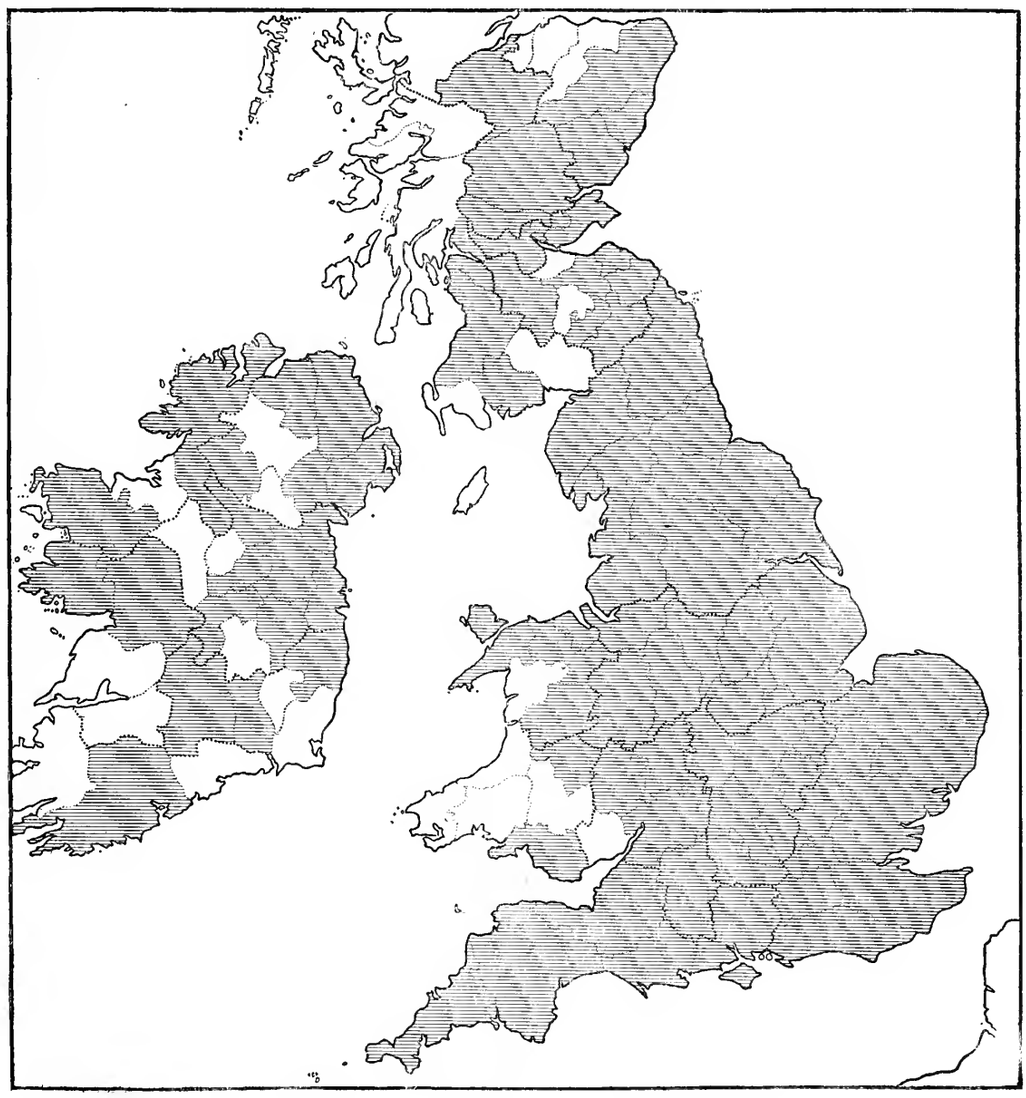
*R. auricomus* Gerard *Herball* 807 (1597); *R. nemorosus dulcis secundus tragi* Parkinson *Theatr. Bot.* 326 (1640); Ray *Syn.* ed. 3, 248 (1724).

**Ranunculus auricomus** L. *Sp. Pl.* 551 (1753)!; Smith *Eng. Bot.* no. 624 (1799)!; *Fl. Brit.* 590 (1800); Syme *Eng. Bot.* i, 36 (1863); Rouy *Fl. France* i, 101 (1893).

Icones:—Smith *Eng. Bot.* t. 624; Curtis *Fl. Lond.* i, 111; *Fl. Dan.* t. 665; Reichenbach *Icon.* iii, t. 12, et t. 13 (several varieties); Syme *Eng. Bot.* i, t. 32.

*Camb. Brit. Fl.* iii. *Plate 135.* (*a*) Root and lower leaves. (*b*) Stem with partially abortive flowers. (*c*) Stem with perfect flowers. (*d*) Head of ripe achenes. (*e*) Achenes (one enlarged). *a*—*b* from Huntingdonshire (E. W. H.): *c* from Huntingdonshire (E. W. H.): *d*—*e* from Cambridgeshire (C. E. M.).

Exsiccata:—Billot, 502, et 502 bis, as *R. auricomus*; Don, 16; Fellman, 5; Reichenbach, 1086; 1286, as *R. auricomus* var. *grandiflorus*; Schultz (*H. N.*), v, 408; *Herb. Fl. Ingric.* i, 17; vii, 17 c, as *R. auricomus* var. *incisifolius*; vii, 17 d, as *R. auricomus* var. *fallax*; vii, 17 e, as *R. auricomus* var. *cassubicus.*



Map 52. Distribution of *Ranunculus auricomus* in the British Islands

Perennial, with short rhizomes. *Root* small, not much thickened. *Shoot* glabrous or nearly so, hollow, up to 3 dm. high. *Ground leaves* with very long petioles; laminae 3-partite or 3-lobed, segments very variable in shape and lobing, 2—3 cm. long. *Stem-leaves* sessile, with 8—2 lobes; segments of the lower leaves either narrowly cuneate and with 2—3 lobes or linear. *Pedicels* not furrowed, slightly pubescent, up to 6 cm. long. *Receptacle* glabrous, much longer than broad. *Flowers* up to 2 cm. in diameter; April and May. *Sepals* spreading, pubescent. *Petals* yellow, often more or less abortive, sometimes quite suppressed; nectary without a covering scale. *Head of achenes* subglobose, rather loosely packed. *Achenes* only slightly compressed, slightly pubescent, scarcely margined; beak long, apex recurved.

The apetalous or hemi-apetalous form (*R. auricomus* subvar. *apetalus* nobis = *R. auricomus* var. *apetalus* Wallroth ex DC. *Prodr.* i, 34 (1824)) appears to be common throughout the range of the species in Great Britain, particularly in the north.

Many leaf-forms have received varietal names. Cf. Wallroth *Sched. Crit.* 290 (1822); also *Bot. Exch. Club Brit. Is. Rep. for 1911*, p. 7. Whether or not these forms have been tested in cultivation we are unable to state.

Woods and shady hedgebanks, very rare on grassland; a lowland plant, ascending to 275 m. in the West Riding of Yorkshire; a typical mesophile, avoiding extreme soils (such as chalk and peat) of all kinds; from Cornwall and Kent northwards to eastern Inverness-shire, rare in Wales, absent from western and northern Scotland; widespread in Ireland.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 2120 m. in Switzerland), Russia, rare in southern Europe; Asia.

## 7. RANUNCULUS REPENS. Buttercup or Creeping Crowfoot. **Plate 136**

*R. pratensis etiamque hortensis* Gerard *Herball* 804 (1597); *R. pratensis repens* Parkinson *Theatr. Bot.* 329 (1640); Ray *Syn.* ed. 3, 247 (1724).

**Ranunculus repens** L. *Sp. Pl.* 554 (1753)!; Smith *Eng. Bot.* no. 516 (1799)!; *Fl. Brit.* 592 (1800); Syme *Eng. Bot.* i, 40 (1863); Rouy et Foucaud *Fl. France* i, 100 (1893).

Icones:—Smith *Eng. Bot.* t. 516; Curtis *Fl. Lond.* ii, t. 109; Martyn *Fl. Rust.* t. 29; *Fl. Dan.* t. 795; Reichenbach *Icon.* iii, t. 20, fig. 4610.

*Camb. Brit. Fl.* iii. *Plate 136.* (*a*) Flowering shoot with runner. (*b*) Petal. (*c*) Head of achenes (enlarged). (*d*) Achenes (two enlarged). Jersey (E. W. H.).

Exsiccata:—Billot, 2207; Fellman 6; *Herb. Fl. Ingric.* i, 20.

Perennial. *Roots* fibrous, not thickened. *Rhizome* short. *Shoot* usually hairy, up to 6—7 dm. high. *Barren stems* decumbent, long, rooting at the nodes, slightly grooved. *Ground-leaves* with petioles longer than the laminae, petioles with prominent basal sheaths; laminae ternate; pinnae 3-fid, with long or short stalks, with 3 main lobes; lobes coarsely, irregularly, and deeply toothed, teeth acute. *Pedicels* grooved, up to about 8 cm. long. *Receptacle* rather hairy. *Flowers* about 2·0—2·5 cm. in diameter; May to October. *Sepals* narrow, hairy, spreading. *Petals* or nectar-leaves deep yellow, rather longer than broad, scale of nectary conspicuous. *Stamens* about 6 mm. long; filaments about twice as long as the anthers; anthers deep yellow. *Head of achenes* subglobose. *Achenes* compressed, brown, glabrous, margin greenish; beak short, acute.

(*β*) subvar. **glabratus** nobis; *R. repens* var. *glabratus* DC. *Prodr.* i, 38 (1824); Rouy et Foucaud *Fl. France* i, 100 (1893).

*Shoot* glabrous.

This form is mentioned by Smith (*Eng. Bot.* no. 516).

De Vries (in *Ber. deutschen bot. Gesellsch.* xii, 203 (1894)) and Pledge (in *Nat. Science* xii, 179 (1898)) have investigated the variation in the number of the sepals of this species. Putting their results together, we get:—

| No. of petals | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of examples | 8. | 839. | 200. | 95. | 45. | 17. | 9. | 7. | 1. | 1. |

Very common in damp and wet places generally, except on peat; ascending to 820 m. in Scotland, but rare above 600 m.; throughout the British Islands.

Europe (including the Faeröes and Iceland, and ascending to 2212 m. in the Tyrol); northern Africa; Asia (except southern); North America.

## 8. RANUNCULUS ACRIS. Buttercup or Upright Meadow Crowfoot. **Plates 137, 138**

*R. surrectis cauliculis* Gerard *Herball* 804 (1597); *R. pratensis erectus acris* Ray *Syn.* ed. 3, 248 (1724).

**Ranunculus acris** L. *Sp. Pl.* 554 (1753)!; Smith *Eng. Bot.* no. 652 (1799)!; *Fl. Brit.* 593 (1800); Syme *Eng. Bot.* i, 37 (1863); Rouy et Foucaud *Fl. France* i, 102 (1893).

Perennial. *Rhizome* short. *Shoot* more or less hairy, up to about 7 dm. high. *Stem* terete, erect. *Ground-leaves* with long petioles, 3-partite; segments variable in breadth, lobed, lobes irregularly toothed. *Stem-leaves*—lower ones shortly petioled, upper ones sessile and with entire segments. *Pedicels* hairy, terete. *Receptacle* glabrous. *Flowers* about 2·3 to 2·7 cm. in diameter; May to October. *Sepals* pubescent, spreading. *Petals* deep yellow, nectary covered by a scale. *Stamens* about 6—7 mm. long; filaments 2—3 times as long as the anthers; anthers golden yellow. *Head of achenes* subglobose. *Achenes* compressed, glabrous, very finely granulate, margined; beak conspicuous, curved.

The forms of this variable species have been studied by several British botanists who all agree that in this country the "species" named by Jordan are not constant. Syme (*Eng. Bot.* i, pp. 38—39) recognised three subspecies, but corrected his opinion later (see *Journ. Bot.* viii, 257—8 (1870)). F. Townsend (*Journ. Bot.* xxvii, 140 (1889)) gave a summary of Kerner's views (*Schedae ad Fl. Exsicc. Austr.-Hung.* (1888)) which, while doubtless representing the forms of central Europe, seem scarcely applicable to British specimens. Later, Townsend (*Journ. Bot.* xxxviii, 379 (1900)) gave a summary of the views of Rouy and Foucaud (*op. cit.*), and here stated that "intermediate forms naturally and certainly do occur...; but characters which may be inconstant in small areas where different forms are associated may be more constant in a prevailing form within a large area." J. W. White (*Fl. Bristol.* 122 (1912) described and localised six forms "which can easily be recognised if the specimens be typical and complete"; but, besides these six forms, he stated that others occur "without well-marked characters," and these "may be regarded as the normal or central unit around or on each side of which the named varieties arrange themselves." Mr White, in 1913, found himself unable to send even two out of his six varieties to Mr Hunnybun to draw. He wrote (*in litt.*, July 3rd, 1913) that for this purpose "several hundred specimens have been examined, but hardly any would pass the test. With few exceptions, all the plants we come across belong to the large indefinable group of which one can only say it is aggregate *acris*." Mr White kindly offered to send his dried examples. However Mr Hunnybun has fortunately not practised himself in the art of portraying herbarium material; and the illustrations of the *Cambridge British Flora* will therefore continue to represent drawings from living plants alone.

We give below two varieties, each with a subordinate *forma*; and these represent the extreme forms which we have actually met with in our herborisations in this country. We agree with the opinions expressed by previous British workers that many British plants occur which are intermediate in character. Of these intermediate plants, some may be hybrids of the two recognised varieties, and others habitat-states; and it may well be that still others are additional good varieties which would come true from seed, but whose characters are obscured by the prevalence of the hybrids and *formae*.

(*a*) **R. acris** var. **multifidus** DC. *Syst.* i, 278 (1818); *R. boraeanus* Jordan *Observ. Fragm.* vi, 19 (1847)!; Boreau *Fl. Centr. France* éd. 3, ii, 16 (1857); *R. acer* subsp. *boraeanus* Rouy et Foucaud *Fl. France* i, 102 (1893); *R. acer* var. *boraeanus* White *Fl. Bristol* 122 (1912) incl. var. *tomophyllus*, var. *rectus*, and var. *pumilus*.

Icones :—Smith *Eng. Bot.* t. 652 (intermediate), as *R. acris*; Martyn *Fl. Rust.* t. 30, as *R. acris*; Reichenbach, *Icon.* iii, t. 16 bis, fig. 4606, as *R. acris*.

Exsiccata :—Billot, 1105, as *R. boraeanus* (intermediate).

*Rhizome* said to be very short, vertical, and not creeping. *Shoot* very variable with regard to the degree of hairyness, often very hairy below. *Leaves* very deeply lobed, almost compound; lobes of the stem-leaves, especially the upper ones, sublinear with acute sublinear lobelets. *Bracts* linear. *Petals* narrower than in var. *steveni*; scale of nectary said to be longer than broad.

(*β*) var. **multifidus** forma **tomophyllus** comb. nov.; *R. tomophyllus* Jordan *Diagn.* 71 (1864)!; *R. acer* subsp. *boraeanus* var. *tomophyllus* Rouy et Foucaud *Fl. France* i, 102 (1893); *R. acer* var. *tomophyllus* White *loc. cit.*

*Camb. Brit. Fl.* iii. *Plate 137.* (*a*) Lower part of plant. (*b*) Stem and leaves. (*c*) A lower leaf. (*d*) Fertile branches. (*e*) Top of pedicel, and receptacle. (*f*) Achenes (one enlarged). Jersey (E. W. H.).

*Shoot* densely hairy below.

*R. acris* var. *multifidus* is common throughout the British Isles.

Northern and western France (Boreau, *op. cit.*), and to a less extent in many other parts of Europe; naturalised in North America.

(*b*) **R. acris** var. **steveni** Lange *Haandb. Danske Fl.* ed. 4, 593 (1886—88) emend.; White *Fl. Bristol* 122 (1912) incl. var. *friesianus* p. 123; *R. sylvaticus* Thuiller *Fl. Env. Par.* éd. 2, i, 276 (1799)?; Fries *Fl. Suec. Mant.* iii, 50 (1842)!; *R. steveni* Andrz. ex [Besser suppl. iii ad *Catal. Plant. Hort. Botan. Gymnas. Volhyn. Cult.* 19 (1814);] Besser *Enum. Pl. Volhyn.* 22 (1822); Boreau *Fl. Centr. France* éd. 3, ii, 15 (1857) incl. *R. rectus*, *R. vulgatus*, *R. friesianus* p. 16; ?*R. acris* var. *sylvaticus* DC. *Syst. Nat.* i, 278 (1818); *R. acer* subsp. *eu-acris* Syme *Eng. Bot.* i, 38 (1863) incl. subsp. *friesianus* p. 39; *R. acris* subsp. *steveni* Rouy et Foucaud *Fl. France* i, 103 (1893).

Icones :—*Fl. Dan.* t. 2415, as *R. acris*; *Svensk Bot.* t. 375, as *R. acris*; Curtis *Fl. Lond.* i, t. 109, as *R. acris*; Woodville *Med. Bot.* t. 246, as *R. acris*; Reichenbach *Icon.* iii, t. 17, fig. 4605, as *R. steveni*; et fig. 4606 as *R. acris* et *R. parvulus*.

*Camb. Brit. Fl.* iii. *Plate 138.* (*a*) Plant in flower. (*b*) Part of pedicel (enlarged). (*c*) Top of pedicel, and receptacle (enlarged). (*d*) Lower part of petal (enlarged). (*e*) Achenes (one enlarged). Perthshire (C. E. M.).

Exsiccata :—Billot, 1106 ter, as *R. sylvaticus*; 2205, as *R. acris*; 2206, as *R. friesianus*; 3504, as *R. tomophyllus* (intermediate; collected at Thirsk in Yorkshire by J. G. Baker); Fries, xi, 31, as *R. sylvaticus*; Huter (*Iter. Hisp.*), 943, as *R. steveni* var. *granitus*; *Herb. Fl. Ingric.* i, 18, as *R. acris*.

*Rhizome* said to be short and oblique. *Shoot* hairy, especially below, with spreading hairs. *Laminae* less deeply cut than in var. *multifidus*, lobes much broader and those of the lower leaves often overlapping, lobelets obtuse. *Bracts* usually not simple. *Petals* broadly obovate; scale of nectary said to be about as broad as long.

(*β*) var. **steveni** forma **parvulus** comb. nov.; *R. acris* var. *β* Wahlenberg *Fl. Lapp.* 159 (1812).

Icones :—Reichenbach *loc. cit.* fig. 4606 [bis], as *R. parvulus.*

This is a dwarf northern and sub-Alpine state, not uncommon in central and northern Scotland. Frequently it is only 1-flowered.

*R. acris* var. *steveni* is widely distributed in Great Britain, being recorded from Hampshire to Orkney.

Apparently much commoner than var. *multifidus* in northern and central Europe. Naturalised in North America.

*R. acris* is very common throughout the British Islands, especially on grassland, in open places in woods, on grassy road-sides, and in waste places; ascending to 1200 m. in Perthshire.

Europe, including the Faeröes and Iceland, ascending to 2530 m. in the Tyrol; Asia; North America (introduced).

## 9. RANUNCULUS BULBOSUS. Buttercup or Bulbous Crowfoot. Plate 139

*R. bulbosus* Gerard *Herball* 806 (1597); Ray *Syn.* ed. 3, 247 (1724).

**Ranunculus bulbosus** L. *Sp. Pl.* 554 (1753); Smith *Eng. Bot.* no. 515 (1799)!; *Fl. Brit.* 591 (1800); Syme *Eng. Bot.* i, 41 (1863); Rouy et Foucaud *Fl. France* i, 105 (1893).

Icones :—Smith *Eng. Bot.* t. 515; Curtis *Fl. Lond.* i, 107; Martyn *Fl. Rust.* t. 28; Miller *Illustr.* t. 51; Reichenbach *Icon.* iii, t. 20 (Ranunc.), fig. 4611.

*Camb. Brit. Fl.* iii. *Plate 139.* (*a*) Lower, (*b*) middle, and (*c*) upper parts of a plant. (*d*) Lower leaf. (*e*) Head of achenes (enlarged). (*f*) Achenes (two enlarged). Huntingdonshire (E. W. H.).

Exsiccata :—Billot, 2208, 2208 bis, 2208 ter, as *R. bulbosus*; 3305, as *R. sparsipilus*; *Herb. Fl. Ingric.* x, 1913.

Perennial. *Roots* fibrous. *Rootstock* swollen at the base into a "bulb" or corm about 2·0 cm. broad and 1·5 high; aërial stem erect, more or less hairy. *Leaves* with petioles much longer than the laminae, hairy; *laminae* ternate; *pinnae* pinnate or pinnatifid, sessile or shortly stalked; lobes more or less divided. *Peduncle* grooved, up to about 1 dm. long. *Receptacle* rather hairy. *Flowers* about 2·5—3·0 cm. in diameter; April to June, often the first of the common buttercups to come into flower. *Sepals* reflexed, rather caducous, hairy. *Petals* yellow. *Head of achenes* subglobose. *Achenes* glabrous; beak short, a little curved.

This is the buttercup *par excellence* of the alluvial pastures of southern England, turning them in the month of May into fields of gold. On chalk downs and on sand-dunes the plant is often very dwarfed and very hairy.

Grassland, especially alluvial grassland (on which the plant is very vigorous) and calcareous grassland (where it is often dwarfed); northwards to Caithness-shire, but rare in northern and western Scotland, ascending to nearly 550 m. in Perthshire; throughout Ireland.

Europe (excl. northern and Arctic), ascending to 1900 m. in Switzerland; Asia; northern Africa; North America (introduced).

## 10. RANUNCULUS ALEAE. Plate 139 bis

**Ranunculus aleae** Willkomm in *Linnaea* xxx, 84 (1859); *R. neapolitanus* Godron *Fl. France* i, 34 (1848) non Tenore; *R. bulbosus* var. *neapolitanus* Cosson *Notes Crit.* i, 3 (1848) non Fiori, excl. syn. Tenore; *R. bulbosus* var. *meridionalis* [Levier ined., ex] Malinvaud in *Bull. Soc. Bot. France* xxx, p. cxcii (1883); *R. bulbosus* subsp. *aleae* Rouy et Foucaud *Fl. France* i, 106 (1893).

Icones :—Willkomm *Illustr. Pl. Hisp.* i, t. 63 B et 64, as *R. aleae.*

*Camb. Brit. Fl.* iii. Plate 139 bis. (*a*) Whole plant. (*b*) Flower. (*c*) Part of petal with nectary (enlarged). (*d*) Stamens (enlarged). (*e*) Head of achenes. (*f*) Achenes (enlarged). Jersey (T. W. A.).

Exsiccata :—Huter, Porta, et Rigo (*Iter Hisp.*), 939, as *R. aleae* forma *laciniata.*

Closely allied to *R. bulbosus* from which it differs in the following characters :—*Rootlets* rather longer and stouter. *Corm* more feebly developed or almost entirely absent. *Shoot* branched from the base, branches wide-spreading or ascending. *Pinnae* of the radical leaves with longer petiolules; of the upper leaves linear and more variable in length. *Peduncles* less grooved below. *Receptacle* more elongate. *Buds* large and hairy. *Flowers* about 3·0 cm. in diameter, usually rather larger than in *R. bulbosus*; April and May. *Petals* more acute, pale yellow.

Noticed by Mr Hunnybun in Jersey, where we had no difficulty in finding it in April, 1914. It is quite a feature in some places on the dunes there; and it spreads some distance inland on the light, sandy soils. The paler tint of the flowers and the more patulous habit enable the botanist to distinguish it at a glance from *R. bulbosus* with which it grows, and with which we believe it forms hybrids.

Locally rather abundant on light soils, especially on fixed dunes, in Jersey: it should be looked for elsewhere in the Channel Isles and in the south of England.

Sweden and Finland (cf. Rouy et Foucaud *op. cit.* 106), ? Denmark, France, southern Europe; Algeria.

## 11. RANUNCULUS SARDOÜS. Hairy Crowfoot. Plate 140

*R. rectus foliis pallidioribus hirsutus* Ray *Cat. Cantab. App.* i, 8 (1663); *Syn.* ed. 3, 247 (1724).

**Ranunculus sardoüs** Crantz *Stirp. Austr.* fasc. 2, 84 (1763); ed. 2, 111 (1769); N. E. Brown in *Eng. Bot.* ed. 3, suppl., 16 (1892); Rouy et Foucaud *Fl. France* i, 107 (1893); *R. bulbosus* var. β Hudson *Fl. Angl.* 211 (1762); *R. hirsutus* Curtis *Fl. Lond.* i, 108 (ca. 1776); *R. philonotis* Ehrhart *Beitr.* ii, 145 (1788)!.

Icones:—*Fl. Dan.* t. 1459, as *R. philonotis.*

Exsiccata:—Billot, 306, 306 bis, 306 quater, as *R. sardoüs*; Ehrhart, 116, as *R. philonotis*; Fries, vii, 26, as *R. philonotis*; Porta et Rigo (*Itin. I Ital.*); Reichenbach, 372, as *R. hirsutus*; 2586, as *R. hirsutus* var. *verrucosus*; Todaro 1377, as *R. philonotis.*

Annual. *Shoot* erect, 2—5 dm. high, branched, very variable in hairyness. *Ground-leaves* with very long petioles (3—4 times as long as the laminae); laminae ternate; pinnae variously lobed, terminal one stalked. *Stem-leaves* very variable, lobes broad or narrow. *Pedicel* grooved. *Receptacles* hairy, elongate, about 6 mm. long and 2—3 broad, rather hairy. *Flowers* about 1·5 to 2·5 cm. in diameter; June to September. *Sepals* reflexed. *Petals* yellow. *Head of achenes* subglobose. *Achenes* usually more or less tuberculate, especially near the margin; beak short, nearly straight.


Map 53. Distribution of *R. sardoüs* in Great Britain

(*a*) **R. sardoüs** var. **hirsutus** Rouy et Foucaud *Fl. France* i, 107 (1893); *R. hirsutus* Curtis *Fl. Lond.* i, 108 (ca. 1776) sens. str.; Smith *Fl. Brit.* 592 (1800)!; Syme *Eng. Bot.* i, 43 (1863).

Icones:—Curtis *Fl. Lond.* i, t. 108, as *R. hirsutus*; Smith *Eng. Bot.* t. 1504, as *R. hirsutus*; Reichenbach *Icon.* iii, t. 23 (*Ranunc.*), fig. 4617, as *R. hirsutus.*

*Camb. Brit. Fl.* iii. *Plate 140.* (*a*) Whole plant. (*b*) Petal. (*c*) Thalamus. (*d*) Head of achenes. (*e*) Achenes (one enlarged). Jersey (E. W. H.).

Habit of *R. bulbosus*. *Shoot* very hairy, especially above. *Flowers* large, about 2·5 cm. in diameter.

(*b*) **R. sardoüs** var. **parvulus** Rouy et Foucaud *Fl. France* i, 108 (1893); *R. parvulus* L. *Mant. Pl.* 79 (1767)!; Smith *Fl. Brit.* 593 (1800); *R. hirsutus* var. *parvulus* Gray *Nat. Arr. Brit. Pl.* ii, 717 (1821).

*Camb. Brit. Fl.* iii. *Plate 140.* (*f*) Ground leaves. (*g*) Part of stem. (*h*) Upper part of plant. Huntingdonshire (E. W. H.).

*Shoot* less hairy, especially above, than in var. *hirsutus*. *Flowers* smaller, about 1·5 cm. in diameter.

We are unable to give any detailed account of the British distribution of these varieties of *R. sardoüs*. We can only state that we have met with var. *hirsutus* in damp, submaritime pasture and meadows in Hampshire, Norfolk, etc., and var. *parvulus* in open parts of oak-woods on clay in Huntingdonshire.

Local, on damp and alluvial soils, usually in permanent pasture and meadows near the sea, rarer inland, as in damp oak-woods; northwards to Perthshire; not known in Ireland.

Europe (excl. Norway); Asia Minor; northwestern Africa to the Azores.

## 12. RANUNCULUS PARVIFLORUS. Small-flowered Crowfoot. Plate 141

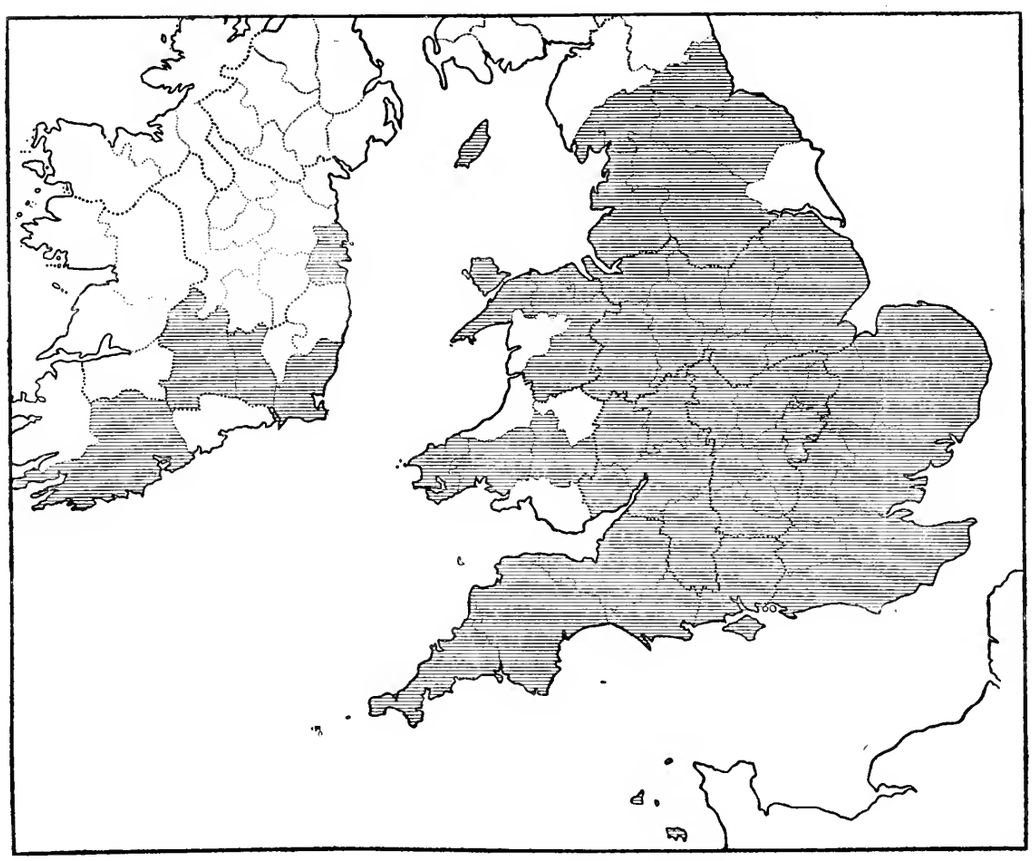
*R. hirsutus annuus flore minimo* Ray *App. Cat. Cantab.* 8 (1663); *Syn.* ed. 3, 248, t. 12, fig. 1 (1724); *R. hirsutus annuus geranii columbini* Merrett *Pinax* 102 (1666).

**Ranunculus parviflorus** L. *Syst.* ed. 10, 1087 (1759)!; Smith *Eng. Bot.* no. 120 (1792)!; *Fl. Brit.* 594 (1800); Syme *Eng. Bot.* i, 45 (1863); Rouy et Foucaud *Fl. France* i, 110 (1893); *R. muricatus* var. δ L. *Sp. Pl.* 555 (1753).

Icones :—Smith *Eng. Bot.* t. 120; *Fl. Dan.* t. 1218; Reichenbach *Icon.* iii, t. 22, fig. 4616.

*Camb. Brit. Fl.* iii. *Plate 141.* (*a*) Whole plant. (*b*) Upper part of another plant. (*c*) Achenes (enlarged). Worcestershire (R. F. T.).

Exsiccata :—Billot, 307, 307 bis; Don, 33; Reichenbach, 1585; Schultz (*H. N.*), v, 411; Welwitsch (*Fl. Lusit.*), 206.



Map 54. Distribution of *R. parviflorus* in the British Islands

Annual, ephemeral. *Shoot* diffuse, with spreading hairs, 1—5 dm. *Ground-leaves* soon withering, with petioles 2—3 times as long as the laminae; laminae simple, suborbicular, cordate at the base, margin coarsely toothed, apex very obtuse, about 2—3 cm. broad. *Stem-leaves* petioled, more or less deeply 3—5-lobed. *Pedicels* furrowed. *Receptacle* glabrous. *Flowers* often imperfect, about 5 mm. in diameter; May. *Sepals* reflexed, narrow. *Petals* pale yellow, narrow, not contiguous, often more or less abortive. *Stamens* few. *Head of achenes* subglobose. *Achenes* covered with small tubercles; beak somewhat hooked.

Local, on dry grassland (usually calcareous) and hedgebanks in lowland districts; England and Wales (northwards to Durham), and southern Ireland.

France, Spain, Portugal, Italy, Greece; northwestern Africa to the Azores. North America (not indigenous).

## 13. RANUNCULUS ARVENSIS. Corn Crowfoot. Plate 142

*R. arvorum* Gerard *Herball* 805 (1597); Ray *Syn.* ed. 3, 248 (1724).

**Ranunculus arvensis** L. *Sp. Pl.* 555 (1753)!; Smith *Eng. Bot.* no. 135 (1793)!; *Fl. Brit.* 594 (1800); Syme *Eng. Bot.* i, 46 (1863); Rouy et Foucaud *Fl. France* i, 112 (1893).

Icones :—Smith *Eng. Bot.* t. 135; Curtis *Fl. Lond.* ii, 108; Martyn *Fl. Rust.* t. 56; Reichenbach *Icon.* iii, t. 21, fig. 4614.

*Camb. Brit. Fl.* iii. *Plate 142.* (*a*) Whole plant. (*b*) Achene. Huntingdonshire (H. C.).

Exsiccata :—Billot, 3701; Bourgeau (*Pyr. Espagn.*), 365; Fries, viii, 27; Schultz, 101; Todaro; Wirtgen vi, 218.

Annual. *Shoot* 1—4 dm. high, erect. *Ground-leaves* with petioles about as long as the laminae; laminae with 3—5 lobes; lobes cuneiform, with 3—5 teeth at the apex. *Stem-leaves* with shorter petioles and more linear segments and fewer apical teeth. *Pedicels* terete. *Receptacle* hairy, flattened. *Flowers* about 1 cm. in diameter; May to August. *Sepals* spreading, rather hairy. *Petals* pale yellow. *Achenes* 4—8 on each receptacle, with prominent and acute prickles, compressed, about 1 cm. long; beak rather long, narrow, curved.

A weed of cornfields in lowland localities; throughout England; rare in Wales, Scotland (northwards to Perthshire), and hilly districts generally; not recorded for Ireland.

Europe (excl. Norway); western Asia; North America (not indigenous).

Map 55. Distribution of *R. arvensis* in Great Britain

## Section IV. *HECATONIA*

**Hecatonia** Loureiro *Fl. cochinch.* 302 (1790) as a genus; Grenier et Godron *Fl. France* i, 38 (1848) as a section; Rouy et Foucaud *Fl. France* i, 112 (1893) as a section.

For characters, see page 125. Only species :—*R. sceleratus.*

## 14. RANUNCULUS SCELERATUS. Celery-leaved Crowfoot. Plate 143

*R. palustris* Gerard *Herball* 814 (1597); Ray *Syn.* ed. 3, 249 (1724).

**Ranunculus sceleratus** L. *Sp. Pl.* 551 (1753)!; Smith *Fl. Brit.* 590 (1800)!; Syme *Eng. Bot.* i, 31 (1863); Rouy *Fl. France* i, 112 (1893); *Batrachium sceleratum* Lange *Danske Fl.* ed. 3, 585 (1886—1888).

Icones :—Smith *Eng. Bot.* t. 681; Curtis *Fl. Lond.* i, t. 112; *Fl. Dan.* t. 571; Reichenbach *Icon.* iii, t. 11, fig. 4598.

*Camb. Brit. Fl.* iii. *Plate 143.* (*a, b*) Lower leaves. (*c*) Upper part of plant. (*d*) Receptacle. (*e*) Receptacle (enlarged). (*f*) Achenes (two enlarged). Cambridgeshire (C. E. M.).

Exsiccata :—Billot, 2405, 2405 bis; Ehrhart, 386; Todaro, 1378; *Herb. Fl. Ingric.* i, 21.

Annual. *Shoot* up to 8 dm. high, shining, glabrous or pubescent, erect. *Stem* grooved, hollow. *Basal leaf-sheaths* conspicuous. *Lower leaves* with petioles 2—3 times as long as the laminae; laminae deeply divided into 3 main lobes, main lobes 3-fid, divisions toothed, teeth obtuse. *Stem-leaves* with long petioles. *Receptacle* very elongate, about 10 mm. long and 3 broad, somewhat hairy. *Pedicel* grooved. *Flowers* protogynous, about 7 mm. in diameter; May to September. *Sepals* reflexed. *Petals* yellow, caducous, not contiguous. *Stamens* caducous, appressed to the ovaries, about half as long as the petals. *Ovary* ripening and elongating rapidly, and soon becoming the most conspicuous part of the flower. *Achenes* very numerous, small (about 2 mm. long), glabrous, rimmed, scarcely beaked.

There are several habitat states or *formae* of this species: one is entirely submerged under water; and another has floating leaves.

In or near stagnant water; from the Channel Isles, Cornwall, and Kent, northwards to Caithness-shire; widespread in Ireland; usually a lowland plant.

Europe, ascending to 1475 m. in the Tyrol; Asia; north-western Africa; North America.

## Section V. *BATRACHIUM*

**Batrachium** DC. *Syst. Nat.* i, 233 (1818); [Gray *Nat. Arr. Brit. Pl.* ii, 720 (1821) as a genus;] Rouy and Foucaud *Fl. France* i, 58 (1893); [*Ranunculoïdes* Vaillant *Bot. Paris* 170 (1727)].

As is well known, the species of *Ranunculus* belonging to the section *Batrachium* are for the most part very variable. We do not think their polymorphism is very much more pronounced than in many other groups of plants, especially aquatic groups; but the water-crowfoots are attractive plants and have for long received considerable attention. Hence their variability is better known than in some other groups. Much of the variability in *Batrachium* is due to habitat-conditions; and the undoubted influence of habitat factors induced some botanists of previous generations to regard all the members of the section *Batrachium* as a single species. Bentham (*Handbook* p. 60), for example, reduced them all to "*Ranunculus aquaticus*[1] Linn.," and only recognised four varieties. Such synthetical treatment receives no support from the leading modern works on the flora of Europe. Recent botanists, in fact, appear to have arrived at comparative unanimity regarding the number of species of *Batrachium*. So far as British botanists are concerned, the modern views date back to Gray's *Nat. Arr. Brit. Plants* ii, 720 (1821). Gray had seven species. Allowing for the fact that *R. homoïophyllus* (= *R. lenormandi*) was not distinguished in Gray's time, there is very little difference to be observed in the limitations of species by Gray (1821), Godron (1840), Syme (1863), Sir J. D. Hooker (1884), Rouy and Foucaud (1893), and the present work. Of botanists with markedly analytical tendencies, there have been Babington in this country and Boreau (*Fl. Centr. France*) in France. Babington (*Manual* ed. 9) made fifteen species: we have ten.

We think those botanists are correct who regard the water-crowfoots as having descended from ordinary terrestrial or marsh buttercups; and accordingly we place the section *Batrachium* at the end of the genus. The species belonging to the series *Hederacei* (see below) seem to be nearer the section *Eu-Ranunculus* than the series *Aquatiles*. On this view, the primitive Batrachian crowfoot was destitute of submerged leaves, and possessed a glabrous receptacle and glabrous achenes. *R. tripartitus* connects the series *Hederacei* with the series *Aquatiles*; and *R. tripartitus* has often only caducous or rudimentary submerged leaves, and its achenes are glabrous. The other species of the series *Aquatiles* with glabrous achenes (*R. obtusiflorus*, *R. triphyllus*, and *R. fluitans*) connect *R. tripartitus* with *R. aquatilis* and the closely allied *R. trichophyllus*. The most aberrant species are those which are destitute of floating leaves, namely, *R. fluitans* among the species with glabrous achenes and *R. circinatus* among those with hairy achenes.

For characters of *Batrachium*, see page 125.

### Series of *Batrachium*

Series i. **Hederacei** (see below). *Submerged* (= lower filamentous) *leaves* absent. *Receptacle* glabrous. *Achenes* glabrous.

Series ii. **Aquatiles** (p. 141). *Submerged* (= lower filamentous) *leaves* present (but cf. *R. tripartitus*). *Receptacle* usually hairy (best judged when dry; but cf. *R. fluitans*). *Achenes* glabrous or hairy.

### Series i. *HEDERACEI*

**Hederacei** Rouy et Foucaud *Fl. France* i, 59 (1893).

For characters, see above.

### Species of *Hederacei*

15. **R. hederaceus** (see below). *Lobes of the laminae* broadest at the base. *Flowers* small, 0·4—1·0 cm. in diameter. *Achenes* straight on the inner margin.

16. **R. homoïophyllus** (p. 139). *Lobes of the laminae* constricted at the base. *Flowers* larger[2], 1·0—1·6 cm. in diameter. *Achenes* convex on the inner margin.

## 15. RANUNCULUS HEDERACEUS. Ivy-leaved Crowfoot. Plate 144

*R. hederaceus* Johnson *Kent* 29 (1632); *R. hederaceus aquaticus* Parkinson *Theatr. Bot.* 1216 (1640); *R. aquatilis hederaceus albus* Ray *Syn.* ed. 3, 249 (1724).

**Ranunculus hederaceus** L. *Sp. Pl.* 556 (1753)!; Smith *Fl. Brit.* 595 (1800)!; Babington in *Mag. Nat. Hist.* ser. 2, xvi, 404 (1855)!; Syme *Eng. Bot.* i, 29 (1863) excl. syn. Gussone; Willkomm et Lange *Prodr. Fl. Hisp.* iii, 906 (1880); Rouy et Foucaud *Fl. France* i, 59 (1893) excl. syn. Tenore p. 60 et syn. Gussone p. 60; *R. hydrocharis* form *hederaefolius* Hiern in *Journ. Bot.* ix, 67 (1871)[3]; *Batrachium hederaceum* Gray *Nat. Arr.* ii, 721 (1821).

[1] We do not know whence Bentham got this name: we have not come across it in any of the works of Linnaeus.

[2] In comparing allied species, it is important only to compare analogous *formae*: the mud state of one species should not be compared with the deep water state of another.

[3] We cite Mr Hiern's names as "forms," just as he uses the word; but it must not be inferred that the term has the same significance as "*forma*." As a matter of fact, Mr Hiern's "forms," or "ultimate forms" as he terms them on p. 44 (1871), have no definite rank; and consequently it is incorrect to cite him as the sponsor when they are given the definite systematic grade of species, subspecies, race, variety, subvariety, or *forma*.

Icones :—Smith *Eng. Bot.* t. 2003; Curtis *Fl. Lond.* ii, t. 110; *Fl. Dan.* t. 321; *Svensk Bot.* t. 673; Reichenbach *Icon.* iii, t. 2, fig. 4573.

Exsiccata :—Billot, 2604 et 2604 bis; Durieu, 414; Fries, ii, 43; v. Heurck et Martinis, iv, 152; Huter, 934; Welwitsch (*Fl. Lusit.*), 664.

Perennial. *Branches* about 1—4 dm. long, rooting at the nodes. *Sheaths* not or scarcely auricled, adnate, longer than broad. *Petioles* about 2—4 times as long as the laminae. *Laminae* simple, subcordate, with 3—5 lobes, lobes broadest at the base, basal sinus usually wide, margin entire or crenulate, often with purplish blotches, often about 3 cm. long and 2 broad. *Pedicels* shorter than the mature petioles. *Flowers* 0·4—1·0 cm. in diameter; May to August. *Petals* usually as long as or a little longer than the sepals, not contiguous. *Stamens* about 5—10. *Stigma* lateral. *Achenes* small, about 15—20 on each receptacle, the inner side nearly straight; beak rudimentary.

(*β*) forma **natans** nobis; *R. hydrocharis* form *homoïophyllus* Hiern *op. cit.*; *R. hederaceus* var. *homoïophyllus* auct. plur.; non *R. homoïophyllus* Tenore *loc. cit.* nec *R. coenosus* Gussone *loc. cit.*

Icones :—*Camb. Brit. Fl.* iii. *Plate 144.* Huntingdonshire (E. W. H.).

Exsiccata :—Reichenbach, 1490, as *R. hederaceus*; Welwitsch (*Fl. Lusit.*), 664, as *R. hederaceus*; Wirtgen, x, 546, as *Batrachium hederaceum* var. *fluitans.*

This is the water-form or floating-form of the species. It is a larger plant than the mud-form or the form of shallow water, has longer rootlets and stems, larger leaves and flowers. It is widespread in the British Isles; and, in the drier parts of the country, e.g., East Anglia and the Channel Isles, it is met with more often than the mud-form or so-called "type." The plant is, nomenclatorially at least, often confused with the following species.

On wet mud, in small streams, ditches, and ponds, usually in shallow water; preferring non-calcareous soil and water rather poor in mineral-content; throughout the British Isles, but local or rare in eastern England.

Iceland, Scandinavia, Denmark, Germany, Holland, Belgium, France, south-western Europe; North America (not indigenous).

## 16. RANUNCULUS HOMOÏOPHYLLUS. Plates 145; 146

**Ranunculus homoïophyllus** Tenore *Fl. Nap.* iv, 328 (1830); Moss in *Journ. Bot.* lii, 118 (1914); *R. hederaceus* Tenore olim; Gussone *Pl. Rar.* 219 (1826); excl. omn. syn.; *R. coenosus* Gussone *Suppl. Fl. Sic. Prodr.* fasc. i, 187 (1834)!; Godron in Grenier et Godron *Fl. France* i, 19 (1848)!; Borrer in Hooker and Arnott *Brit. Fl.* ed. 6, 8 (1850); Babington *Man.* ed. 3, 7 (1851)!; in *Ann. Nat. Hist.* ser. 2, 403 (1855)!; *R. lenormandi* Schultz in *Bot. Zeit.* xx, 726 (1837)!; Godron in *Mém. Soc. Roy. Nancy* 14 (1840); Babington in *Ann. Nat. Hist.* xvi, 141 (1845)!; Syme *Eng. Bot.* i, 28 (1863)!; Rouy et Foucaud *Fl. France* i, 60 (1893); *R. reniforme* Desportes *Fl. Sarthe et Mayenne* 3 (1838); *R. hederaceus* var. *grandiflorus* Babington *Man.* 5 (1843)!; *Batrachium coenosum* Schultz in *Arch. Fl. France et Allem.* 70 (1844)!; *R. hydrocharis* form *lenormandi* Hiern *op. cit.* 66 (1871)!

Icones :—Babington in *Eng. Bot. Suppl.* t. 2930, as *R. lenormandi*; Dreves et Hayne *Pl. d'Eur.* t. 106, as *R. hederaceus.*

Exsiccata :—E. et A. Huet (*Pl. Sic.*), as *R. coenosus*; Lenormand (in Herb. Univ. Cantab.), as *R. lenormandi*; Lojacono (*Pl. Sic. Rar.*), 247, as *R. coenosus*; Schultz (*Fl. Gall. et Germ.*), 1001 bis, as *B. coenosum*; Schultz et Winter (*H. N.*), i, 5, as *B. lenormandi*; Todaro (*Fl. Sic.*), 262, as *R. coenosus.*

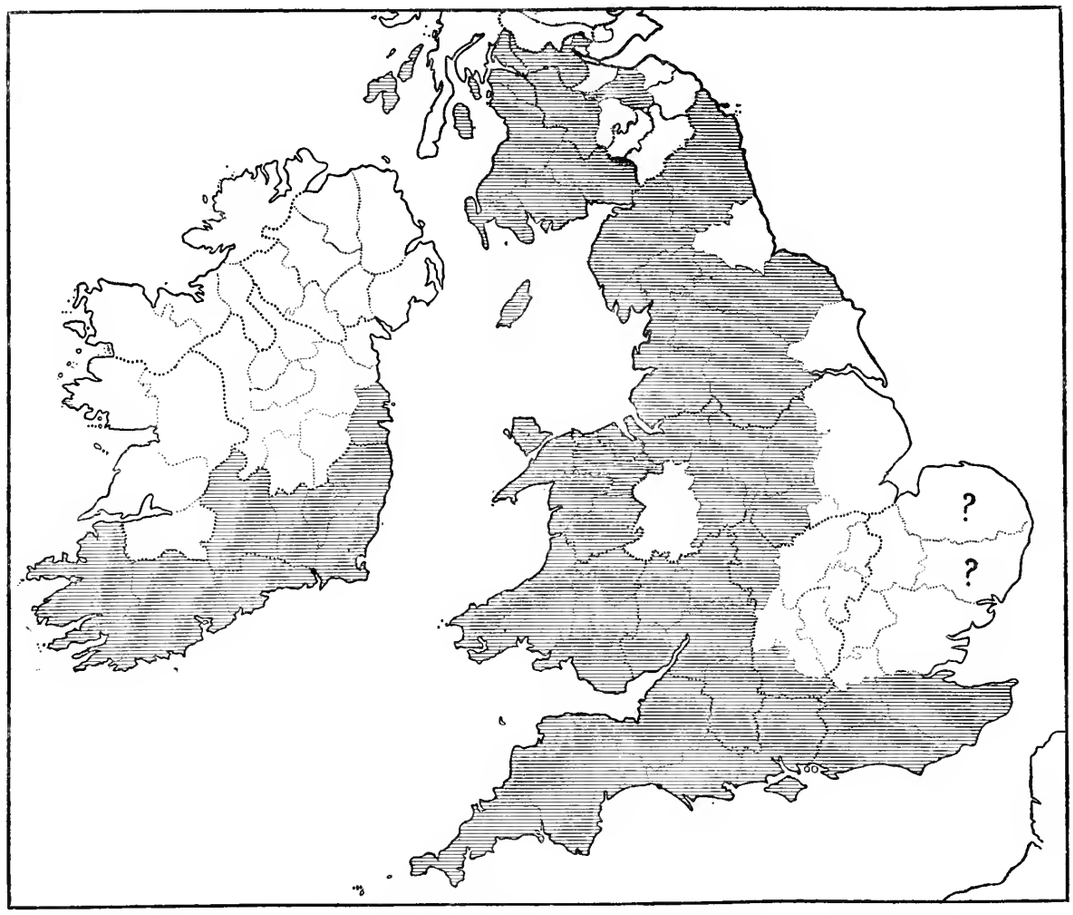
Perennial. *Branches* rooting at the nodes. *Sheaths* broader than in *R. hederaceus.* *Petioles*, when mature, usually much longer than the laminae. *Laminae* simple, reniform to suborbicular, relatively less broad than in *R. hederaceus*, basal sinus often narrow, with 3—5 lobes; lobes constricted at the base. *Peduncles* shorter than the mature petioles. *Flowers* larger than in *R. hederaceus*, 1·0—1·6 cm. in diameter; chiefly April to July, but not infrequently during mild weather in mid-winter. *Petals* rather acute, about twice as long as the sepals, not contiguous. *Stamens* about 10. *Stigma* placed subcentrally. *Achenes* about 30—60, convex on the inner side, beaked.

This species is closely allied to *R. hederaceus*, and is best distinguished from it by the lobes of its laminae being constricted at the base: in *R. hederaceus* the lobes are widest at the base. The size of the flowers varies in both species a great deal according to the habitat-conditions. Unfortunately, many systematic botanists have, in the past, been content to describe only what they have arbitrarily regarded as the "type" of a species, and have often disregarded all forms which they chose to look upon as deviations from this "type." The result has been that the unsophisticated field-botanist, who often meets with the deviations from the so-called "type," is frequently bewildered. We frankly confess that we ourselves are frequently unable to determine what *the type of a species* is, although it is often possible (by a study of authentic descriptions, specimens, and figures) to determine

the particular form of a species which a given author chose to regard as the "type." In the case of a variable species originally described, for example, by Linnaeus, it is sometimes possible to determine the particular form of that species which Linnaeus had before him or had in his mind's eye when he penned his original description. This particular form would be correctly described as *the Linnaean type*; but it is not necessarily the type of that abstraction which is known to botanists as the species.

Hooker and Arnott (*Brit. Fl.* ed. 7, 8 (1855)) could not have known very much about the distribution of this species when they suggested, as they virtually did, that it was a state of *R. hederaceus* induced by warm water, being "principally met with in ditches where the temperature is raised by warm condensed steam." As a matter of fact, *R. homoïophyllus* (= *R. lenormandi*) is locally abundant on the Pennines in swamps of *Juncus effusus* and in streamlets up to an altitude of about 490 m., where any suggestion of the temperature of the water being "raised by warm condensed steam" is preposterous. It was, of course, formerly the fashion among systematists to attribute practically all variation in plants to habitat-conditions; and it is perfectly true that these are the cause of a great deal of variation, but by no means all.

Recent authorities have come to name the present species *R. lenormandi* Schultz (*loc. cit.*). In doing so, they appear to have overlooked the fact that Schultz himself acknowledged that his *R. lenormandi* was identical with *R. coenosus* Gussone (*loc. cit.*). However Schultz acknowledged this in *Arch. de Fl. France et Allem.* 70 (1841) and in the *Fl. Gall. et Germ. exsiccatae*, no. 1001 (issued as *Batrachium coenosum*). Godron (*loc. cit.*) and Babington (*loc. cit.*) also recognised the identity of *R. lenormandi* Schultz and *R. coenosus* Gussone. It is clear—and no one seems ever to have questioned the fact—that *R. coenosus* Gussone is precisely the same as *R. homoïophyllus* Tenore. If this indeed be doubted, a careful comparison of the original descriptions of Gussone and Tenore will establish the fact beyond question. Gussone described his *R. coenosus*




Map 56. Distribution of *R. homoïophyllus* (=*R. lenormandi*) in the British Islands

four years after Tenore had named his *R. homoïophyllus*; and it is clear to us that Gussone had Tenore's account in front of him when doing so. Gussone discusses the matter in the same way as Tenore had done before him, going over the same ground, and using the same arguments and almost the same phraseology. For example, both these Italian authorities point out that they had formerly named the plant *R. hederaceus*: both acknowledge that this was an error; and both cite and praise an English figure of *R. hederaceus* in support of their new position. Tenore referred to the plate in Curtis *Fl. Lond.* and Gussone to that in Smith *Eng. Bot.* It is clear then that *R. homoïophyllus* is the earliest binominal bestowed on the present species, and that it must therefore displace the later *R. coenosus* and the still later *R. lenormandi.*

The history of this nomenclatorial error is interesting. So far as we have traced it, it begins with a question asked by Boreau (*Fl. France* éd. 3, ii, 9 (1857)). "The *Ran. coenosus* Guss. which Mons. Godron regards as identical with *R. lenormandi*, is it," asks Boreau, "really the same species?" Then Boreau cites a few unimportant discrepancies. Boreau's reasonable doubt can easily be removed by those botanists who are acquainted with the mud-forms and the water-forms respectively of the species in question. A later botanist converted Boreau's doubt into a categorical denial; and this denial has been copied by nearly all modern systematists. An examination, however, of authentic specimens, an impartial reading and comparison of the original descriptions of Tenore and Gussone, and a study of the *formae* of the species involved, seem to us to preclude all doubt regarding the name of this species and its synonyms.

(*β*) forma **aquaticus** nobis.

Icones :—*Camb. Brit. Fl.* iii. *Plate 145.* (*a*) Fertile branches. (*b*) Petals (one enlarged). (*c*) Achenes (enlarged). West Riding of Yorkshire (W. H. C.).

This is the state which occurs in deep and sometimes even in quick-running water: it is larger in all its parts than the mud-form. The *laminae* are usually 5-lobed, and the *petals* are longer than the sepals. It seems to be the form originally described by Tenore and Gussone, whilst the mud-form is the state more generally known.

Locally common in swamps, ponds, ditches, and streamlets, usually in shallow water; preferring non-calcareous soils and waters with a low mineral-content, sometimes growing even in acidic water; from Cornwall and Kent northwards to Dumbartonshire, chiefly in the western and northern parts of England, in Wales, and in southwestern Scotland, ascending to 490 m. on the Pennines in Derbyshire; southern Ireland.

Belgium, France, Spain, Portugal, Italy (incl. Sicily); Algeria.

***R. aquatilis* × *homoïophyllus*** comb. nov.; *R. lenormandi* × *peltatus* H. and J. Groves in *Journ. Bot.* xxxix, 121 (1901); × *R. hiltoni*[1] H. and J. Groves *loc. cit.*

Icones :—H. and J. Groves in *Journ. Bot.* xxxix, t. 420.

Icones :—*Camb. Brit. Fl.* iii. *Plate 146.* (*a—b*) Fertile branches. (*c*) Upper leaf. (*d*) Flower-bud. (*e*) Flower. Sussex (T. H.).

Resembling *R. lenormandi* in its rooting habit, the shape of the floating leaves, the number of stamens, and the usually glabrous carpels with rounded inner edge. Approaching *R. aquatilis* in the shape and size of the petals, and the hairy receptacle. *Submerged leaves* with not truly capillary, but the lowest ones very deeply divided into linear segments, and passing upwards by a series of gradations into the ordinary floating leaves.

We have not seen this plant growing. It is a most remarkable plant, and ought to be grown under rigorous cultural conditions. It is without doubt close to *R. homoïophyllus* in some of its features; and if that species hybridises with *R. aquatilis*, what may not be expected in the section *Batrachium*?

In a rather muddy stream in Sussex, in company with the putative parents. Not known elsewhere.

## Series ii. *AQUATILES*

**Aquatiles** Rouy et Foucaud *Fl. France* i, 59 (1893).

For characters, see page 138.

### Subseries of *Aquatiles*

Subseries i. **Tripartiti** (see below). *Submerged leaves* usually present, but more or less caducous in *R. tripartitus*, distinctly petioled. *Floating leaves* usually present, usually divided more than half-way. *Pedicels* usually longer than the leaves. *Receptacle* rather hairy, subglobose. *Flowers* 0·3—1·0 cm. in diameter. *Petals* contiguous or not. *Stamens* usually few (5—15). *Achenes* glabrous.

Subseries ii. **Fluitantes** (p. 144). *Submerged leaves* very well developed, distinctly petioled, segments very long. *Floating leaves* absent. *Pedicels* shorter than the leaves. *Receptacle* ultimately glabrous, longer than broad. *Flowers* usually very large, up to 2·5—3·0 cm. in diameter. *Petals* contiguous or even overlapping, often more than 5. *Stamens* ∞, variable in length. *Achenes* glabrous.

Subseries iii. **Eu-Aquatiles** (p. 146). *Submerged leaves* present, indistinctly petioled or sessile. *Floating leaves* often present, lobes variously cut. *Pedicels* as long as or rather shorter than the leaves. *Receptacle* hairy, subglobose. *Flowers* usually less than 2·5 cm. in diameter. *Petals* contiguous or nearly so. *Stamens* 5—∞. *Achenes* hairy or bristly, up to about 40.

### Subseries i. *TRIPARTITI*

**Tripartiti** nobis. For characters, see above.

### British species of *Tripartiti*

17. **R. tripartitus** (p. 142). *Submerged leaves* usually more or less rudimentary or even caducous (? ever really absent in the young state), persistent, collapsing when taken out of the water. *Pedicels*

[1] After Thomas Hilton (1833—1912).

shorter than the mature petioles. *Flowers* small, 3—10 mm. in diameter. *Petals* rather acute. *Achenes* few, about 15 in each head.

An allied species (*R. hololeucus* Lloyd *Fl. Loir. Inf.* 3 (1844), with much larger flowers and wholly white petals, should be searched for in southern England and southern Ireland.

18. **R. obtusiflorus** (p. 143). *Submerged leaves* well developed, though often rather short, not collapsing when taken out of the water. *Pedicels* longer than the mature petioles, markedly arched in fruit. *Flowers* from 1·0 to 1·5 cm. in diameter. *Petals* obtuse. *Achenes* usually very numerous, about 60—100 in each head in well-grown plants.

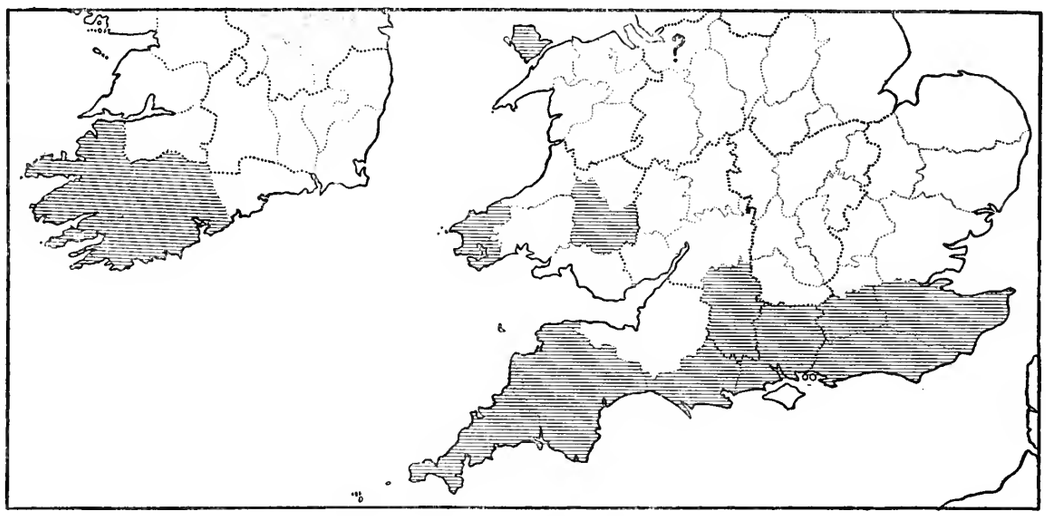
19. **R. triphyllus** (p. 144). *Submerged leaves* well developed, persistent, collapsing when taken out of the water. *Pedicels* longer than the mature petioles. *Flowers* 2 cm. in diameter. *Petals* obtuse. *Achenes* rather numerous, about 40—50 in each head.

## 17. RANUNCULUS TRIPARTITUS. Plates 147, 148

**Ranunculus tripartitus** DC. *Icon. Pl. Gall. Rar.* 15, t. 49 (1808); Godron in *Mém. Soc. Roy. Nancy* 16 (1840); Babington in *Eng. Bot. Suppl.* no. 2946 (1848)!; Syme *Eng. Bot.* i, 27 (1863); N. E. Brown in *Eng. Bot.* ed. 3, suppl. 13 (1891) excl. syn. Knaf; *R. tripartitus* var. *micranthus* DC. *Syst. Nat.* i, 234 (1818); *Batrachium tripartitum* Gray *Nat. Arr.* i, 721 (1821); *R. lutarius* [? Bouvet *loc. cit.*] H. and J. Groves in *Journ. Bot.* xlv, 452 (1907); *R. hydrocharis* form *tripartitus* Hiern *op. cit.* 68, et form *intermedius* p. 67 (excl. syn. Knaf).

Icones:—DC. *op. cit.* t. 49; Reichenbach *Icon.* iii, t. 2, fig. 4574; Babington in *Eng. Bot. Suppl.* t. 2946.

Exsiccata:—Billot, 2403 (the heterophyllous form); Welwitsch (*Fl. Lusit.*), 409 (with submerged leaves alone); 663 (with floating leaves alone); 906 (the heterophyllous form); 1049 (with floating leaves alone); (*Iter. Hisp.*), 673.



Map 57. Distribution of *R. tripartitus* in the British Islands

Annual[1] or perennial. *Branches* 1—5 dm. long, rather slender. *Sheaths* large and broad, adnate below. *Submerged leaves* often more or less rudimentary or caducous or absent, when present sessile; segments capillary, collapsing when taken out of the water. *Floating leaves* with long slender petioles when mature, rather deeply 3-lobed to 3-partite, divided from about half-way down to the base, basal sinus rather wide; lobes cuneate, sides usually entire, apex often with 2—3 crenulations. *Pedicels* shorter than the mature petioles. *Flowers* small, about 4—9 mm. in diameter; April to early July. *Petals* white or pinkish, yellow at the base, rather acute, about as long or a little longer than the sepals, not contiguous. *Stamens* 5—10. *Stigma* laterally placed, narrow, caducous. *Achenes* turgid, rather small, about 15 on each receptacle; beak short.

(*a*) forma **heterophyllus** nobis.

Icones:—*Camb. Brit. Fl.* iii. *Plate 147.* (*a, b, c*) Fertile branches. (*d, e*) Branches with submerged leaves. (*f*) Pedicel and receptacle (enlarged). (*g*) Flower-buds (one enlarged). (*h*) Flowers (four enlarged). (*i*) Petals (two enlarged). (*j*) Achenes (three enlarged). Cornwall (C. R.).

[1] Cf. Syme *loc. cit.*, and Rouy and Foucaud *loc. cit.*

(*β*) forma **isophyllus** comb. nov.; *R. tripartitus* var. *isophyllus* Rouy et Foucaud *loc. cit.*

Icones :—*Camb. Brit. Fl.* iii. *Plate 148.* (*a—b*) Flowering branches. (*c*) Petal (enlarged). (*d*) Flowers. (*e*) Ovaries (enlarged). (*f*) Head of achenes (enlarged). (*g*) Achenes (enlarged). Hampshire (E. S. M.).

From what he believed to be an isophyllous form, H. C. Watson raised heterophyllous plants in 1876; and specimens of his heterophyllous crop are in the herbarium at Cambridge. Since Watson's time, heterophyllous forms have been found growing naturally in the southern and southwestern counties. In nature, the plant is without submerged leaves at maturity.

Specimens of the isophyllous state have been referred by British botanists to *R. lutarius* (Bouvet in *Bull. Soc. Angers* for 1871, 96 (1872)=*Batrachium lutarium* Revel in *Act. Soc. Linn. Bordeaux* xxv, 413, t. 4 (1865)). However, *R. lutarius* is regarded as a variety of *R. homoïophyllus* (=*R. lenormandi*) by French botanists. The English plant has a hairy receptacle, and cannot therefore be referred to the last-named species. Mr N. E. Brown (*op. cit.*) referred the English plants to *R. tripartitus*; and this view seems to us to be correct.

*R. tripartitus* occurs locally in ponds and ditches; preferring non-calcareous waters in lowland districts; from Cornwall and Kent northwards locally to Wales; rather common in the New Forest; Ireland—counties Cork and Kerry.

Western Europe—Belgium, France, Spain, Portugal.

## 18. RANUNCULUS OBTUSIFLORUS. Plates 149, 150

**Ranunculus obtusiflorus** Moss in *Journ. Bot.* lii, 117 (1914); *R. tripartitus* var. *obtusiflorus* DC. *Syst. Nat.* i, 234 (1818); *Batrachium obtusiflorum* Gray *Nat. Arr. Brit. Pl.* ii, 721 (1821); *R. tripartitus* Nolte *Novit. Fl. Holsat.* 51 (1826) non DC.; *R. baudoti* Godron *op. cit.* 21, fig. 4 (1840); Babington in *Ann. Nat. Hist.* ser. 2, xvi, 395 (1855); incl. *R. confusus* Godron in Grenier et Godron *Fl. France* i, 22 (1848); *R. petiveri* var. *minor* Koch *Syn.* ed. 2, 13 (1843); *Batrachium baudoti* van den Bosche *Prodr. Fl. Batav.* 7 (1850) incl. *B. petiveri*; *R. petiveri* Cosson et Germain *Fl. Env. Paris* 5, *Atlas* t. 1, fig. 5—6 (1845); *R. baudoti* [Godron ampl.] Syme *Eng. Bot.* i, 24 (1863); Rouy et Foucaud *Fl. France* i, 65 (1893); *R. marinus* Hooker fil. *Stud. Fl.* ed. 3, 5 (1884); *R. hydrocharis* form *baudoti* Hiern *op. cit.* 69 (1871) et form *confusus.*

Icones :—*Fl. Dan.* t. 1993, as *R. tripartitus*; Babington in *Eng. Bot. Suppl.* t. 2966, as *R. baudoti*; Syme *Eng. Bot.* i, t. 23, as *R. baudoti* var. *confusus.*

*Camb. Brit. Fl.* iii. *Plate 149.* (*a*) Fertile shoot. (*b*) Receptacle and pedicel (one enlarged). (*c*) Flowers. (*d*) Petals (enlarged). (*e*) Ovaries (enlarged). (*f*) Achenes (enlarged). Cornwall (C. C. V.).

Exsiccata :—Billot, 2802, as *R. baudoti*; 2802 bis, as *R. baudoti* var. *terrestris*; 3801, as *R. confusus*; Fries, ix, 28, as *B. marinum*; Schultz (*H. N.*), 404, as *R. baudoti*; Wirtgen, ix, 436, as *R. baudoti*; ix, 437, as *B. petiveri.*

Perennial. *Shoot* larger and stouter than in *R. tripartitus.* *Sheaths* adnate to the petiole for two-thirds of their lower length, not or scarcely auricled. *Petioles* of the floating leaves about 4—6 times as long as the laminae, about 3—6 cm. long; of the lower submerged leaves about as long as the laminae or a little shorter, about 1—3 cm. long. *Submerged leaves* present; segments usually shorter than in *R. aquatilis*, flat, rigid, spreading. *Floating leaves* present or not; when present, basal sinus very broad; rather deeply 3-lobed or 3-partite; lobes sometimes stalked, cuneate, sides entire, apex more or less deeply crenate. *Pedicels* longer than the mature petioles, somewhat tapering, markedly arched in fruit. *Receptacle* longer than broad. *Flowers* about 1·0—1·5 cm. in diameter; April to June. *Sepals* ultimately reflexed, caducous. *Petals* almost contiguous, about 1·5—2·0 times as long as the sepals, obtuse-rounded at the apex. *Stamens* about 10—15. *Stigma* nearly as long as the rest of the ovary, narrow. *Achenes* about 60—100 on each receptacle, crowded, small, glabrous, beaked.

Godron (*loc. cit.*), when founding his *R. baudoti*, states that this species has closer affinity with the group containing *R. tripartitus* than with that containing *R. aquatilis*; and in this opinion we concur.

*R. obtusiflorus* is sometimes confused with the heterophyllous variety of *R. trichophyllus*; but the latter has shorter petioles, hairy achenes, and fewer achenes in each head. The floating leaves of the two species are often not dissimilar.

(*β*) forma **terrestris** comb. nov.; *R. baudoti* var. *terrestris* Grenier in Grenier et Godron *op. cit.* p. 22 (1848); Rouy et Foucaud *Fl. France* i, 66 (1893).

Icones :—Babington in *Eng. Bot. Suppl.* t. 2966, left-hand figure.

*Camb. Brit. Fl.* iii. *Plate 150.* (*a*) Plant in flower. (*b*) Receptacle (enlarged). (*c*) Petal (enlarged). (*d*) Flowers. (*e*) Achenes (enlarged). Cornwall (C. C. V.).

Exsiccata :—Billot, 2802 bis, as *R. baudoti* var. *terrestris.*

This is the mud-form of the variety. It is without floating leaves; and the submerged leaves have thicker and wider segments.

(γ) forma **submersus** comb. nov.; *Batrachium marinum* Fries *Fl. Suec. Mant.* iii, 51 (1842)!; *R. baudoti* var. *submersus* Grenier in Grenier et Godron *op. cit.* p. 22; Rouy et Foucaud *op. cit.* p. 66; form *marinus* Hiern in *Journ. Bot.* ix, 103 (1871) including form *salsuginosus.*

Icones :—*Fl. Dan.* t. 2776, as *Batrachium marinum.*

Exsiccata :—Dörfler, 4810, as *R. marinus*; Fries, ix, 28, as *B. marinum*; Schultz, xx, 1903, as *R. marinus.*

This is a water-state of the species without floating leaves. It occurs, for example, in shallow and strongly brackish water, and is often ill-developed, having then few segments to the leaves, quite small flowers, very few stamens, and fewer and smaller achenes. This small state has flowers very much like those of *R. tripartitus*, except that the petals are not acute or subacute. We have seen it growing in the Isle of Wight and in Forfarshire; and it no doubt occurs elsewhere.

Local, in stagnant and usually brackish water or water with a high mineral-content, in lowland and usually maritime or submaritime situations; Cornwall and Kent northwards to Zetland; here and there in Ireland.

Scandinavia, Denmark, Germany, Holland, Belgium, France, southern Europe (Spain and Portugal to Greece); northern Africa (Algeria); Palestine.

*R. obtusiflorus* × *trichophyllus* (cf. page 150).

## 19. RANUNCULUS TRIPHYLLUS. Plate 151

**Ranunculus triphyllus** Wallroth in *Linnaea* xiv, 584 (1840); Willkomm et Lange *Prodr. Fl. Hisp.* iii, 309 (1880); Babington *Man.* ed. 8, 7 (1881); *R. hydrocharis* form *triphyllus* Hiern *op. cit.* 69 (1871) pro max. parte; *R. diversifolius* race *triphyllus* Rouy et Foucaud *Fl. France* i, 64 (1893).

Icones :—Syme *Eng. Bot.* i, t. 19, as *R.* [*aquatilis* subsp.] *heterophyllus.*

*Camb. Brit. Fl.* iii. *Plate 151.* (*a*) Flowering branch. (*b*) Submerged leaf out of water. (*c*) Petal (enlarged). (*d*) Achenes (three enlarged). Jersey (E. W. H.). (The original drawing of this plate was named *R. triphyllus* var. *obtusilobus* Wallr. by Mr W. P. Hiern.)

Exsiccata :—Dörfler, 5203, as *R. triphyllus.*

*Branches* elongate. *Submerged leaves* petioled; segments capillary, spreading like the rays of a fan, collapsing when taken out of the water. *Floating leaves* more or less deeply divided into 3—5 lobes; lobes variously cut or undivided. *Pedicels* about as long as or rather longer than the leaves, ascending, recurved in fruit. *Receptacle* sparsely hairy, subglobose. *Flowers* about 2 cm. in diameter; April and May. *Petals* contiguous, longer than the sepals. *Stamens* rather few. *Achenes* rather numerous, glabrous.

This species is a link connecting the series *Tripartiti* with the series *Aquatiles.* It occurs in Jersey, where we gathered it in late April, 1914, in three distinct stations. Previous to that date, we had thought it more closely allied to *R. aquatilis* than it really is. It is really closely allied to *R. obtusiflorus*, and is sometimes mistaken for that plant. It is also sometimes confused with "*R. heterophyllus*" (cf. Syme *loc. cit.*).

Rare and rather critical, in ponds; Jersey (!), Devonshire (spec. !), Surrey, Worcestershire (W. P. Hiern in *Bot. Exch. Club Brit. Is. Rep. for 1914*, p. 112), and doubtless elsewhere.

Germany, France, Austria, Russia (Hiern *loc. cit.*), and probably elsewhere.

### Subseries ii. *FLUITANTES*

**Fluitantes** nobis. For characters, see page 141. Only British species :—*R. fluitans.*

## 20. RANUNCULUS FLUITANS. Fennel-leaved Water Crowfoot. Plate 152

*Millefolium maratriphyllum ranunculi flore* Parkinson *Theatr. Bot.* 1257 (1640); *Ranunculo sive polyanthemo aquatili albo affine millefolium maratriphyllum fluitans* Ray *Cat. Angl.* 259 (1670); *Syn.* ed. 3, 250 (1724).

**Ranunculus fluitans** Lamarck *Fl. Fr.* éd. 2, iii, 184 (1778); Godron *op. cit.* 36 (1840); Babington in *Ann. Nat. Hist.* ser. 2, 402 (1855); Syme *Eng. Bot.* i, 17 (1863); Rouy et Foucaud *Fl. France* i, 71 (1893); *R. aquatilis* var. δ L. *Sp. Pl.* 556 (1753); Smith *Fl. Brit.* 596 (1800)!; *R. fluviatilis* Weber in Wiggers *Fl. Holsat.* 42 (1780); Sibthorp *Fl. Oxon.* 176 (1794); *R. peucedanifolius* Gilibert *Fl. Lithuan.* v, 261 (1782); Schrank *Baier. Fl.* ii, 103 (1789); *R. aquatilis* var. *fluviatilis* Withering *Arr. Brit. Pl.* ed. 3, ii, 507 (1796); *R. pantothrix* var. *peucedanifolius* DC. *Syst. Nat.* i, 236 (1818); *Batrachium fluitans* Wimmer *Fl. Schles.* 9 (1841); *R. fluitans* var. *lamarcki* Wirtgen *Fl. Preuss. Rheinpr.* 15 (1857); *R. fluitans* var. *peucedanifolius* Syme *Eng. Bot.* i, 18 (1863).

Icones:—Babington in *Eng. Bot. Suppl.* t. 2870, as *R. fluitans*; Reichenbach *Icon.* iii, t. 2, fig. 4577, as *R. fluitans*.

*Camb. Brit. Fl.* iii. *Plate 152.* (*a*) Fertile branch. (*b*) Receptacle (enlarged). (*c*) Flower. (*d*) Head of achenes. (*e*) Achenes (enlarged). Huntingdonshire (S. H.).

Exsiccata:—Billot, 2404, as *R. fluitans*; Welwitsch (*Fl. Lusit.*), 1007, as *R. peucedanifolius*; Wirtgen, v, 161, as *B. finitans*; *Fl. Exs. Austr.-Hung.*, 1707.

Map 58. Distribution of *R. fluitans* in the British Islands

Perennial. *Shoot* very long (sometimes more than 2 metres). *Branches* very long, robust, submerged. *Submerged leaves* usually very long; sheaths conspicuous, broad, scarcely auricled, more or less adnate, petioles often long; segments usually long, flat, more or less parallel, narrowing towards the tip. *Floating leaves* absent. *Receptacle* ultimately glabrous[1] and rather elongate. *Pedicels* usually stout, shorter than the leaves. *Flowers* large (up to 3·0—3·3 cm. in diameter), often with supernumerary petals; mid-May to July. *Petals* 5—9, 2—3 times as long as the sepals. *Stamens* about 15—20. *Achenes* glabrous, rather turgid, large, inner side rather convex; beak short.

Many botanists recognise two varieties of *R. fluitans*. One, the plant above described, is *R. fluitans* var. *lamarcki* Wirtgen *l.c.* The other is *R. fluitans* var. *bachi* Wirtgen *Fl. Preuss. Rheinpr.* 15 (1857)[2]; Syme *Eng. Bot.* i, 18 (1863); *R. bachi* Wirtgen ex F. Schultz in *Arch. de Fl.* i, 292 (1854); *R. fluitans* race *bachi* Rouy et Foucaud *Fl. France* i, 72 (1893): Billot, no. 1103, as *R. bachi*. The latter (var. *bachi*) is a smaller plant than the former (var. *lamarcki*), the segments of its submerged leaves very much shorter, floating leaves sometimes produced (Brotherston in Herb. Univ. Cantab.), and its flowers smaller. It is recorded for Staffordshire (Syme *op. cit.*), and for some of the Border counties (Cumberland, Roxburghshire, and Berwickshire), as well as for Denmark, Germany, and France. We have not seen the plant growing; and we have been unable to find dried specimens showing ripe achenes. We wonder if the plant is a hybrid.

The mud-form of *R. fluitans* has much shorter branches and leaves, the segments of the leaves flat and obcuneate, and smaller flowers.

*R. aquatilis* var. *cambricus* Ar. Bennett has also been referred to *R. fluitans* by some English botanists.

Some of the river-states of *R. aquatilis* closely simulate *R. fluitans* in habit; and in the absence of ripe fruit it is often difficult to separate the two species.

[1] Cf. *Bot. Exch. Club Brit. Is., Rep. for 1893*, 398 (1894).

[2] Cf. also *Verhand. Naturh. Ver. Preuss. Rheinl.* ii, 22 (1845).

Locally abundant, usually in streams with a decided current and with a high mineral-content; recorded from Cornwall and Kent northwards to southern and central Scotland, and with outlying recorded stations in Aberdeenshire, Banffshire, and co. Antrim; often confused with river-states of *R. aquatilis*.

Denmark, Germany, Holland, Belgium, France, central Europe (up to 948 m.), southern Russia, southern Europe; northern Africa.

### Subseries iii. *EU-AQUATILES*

**Eu-Aquatiles** nobis. For characters, see page 141.

21. **R. aquatilis** (see below). *Submerged leaves* sessile or shortly petioled, collapsing when taken out of the water. *Floating leaves* usually present, laminae divided about half-way down or a little more. *Pedicels* longer than in *R. trichophyllus*. *Receptacle* subglobose. *Flowers* 2·0—2·5 cm. in diameter. *Petals* contiguous or nearly so. *Stigma* short, broad. *Achenes* rather hirsute, about 40 in each head.

22. **R. trichophyllus** (p. 147). *Submerged leaves* sessile, primary divisions often stalked, collapsing or not when taken out of the water. *Floating leaves* often absent; when present, partite or very deeply pinnatifid, lobes cuneate. *Pedicels* short, spreading and somewhat arched in fruit. *Receptacle* subglobose or a little longer than broad. *Flowers* about 1—2 cm. in diameter. *Petals* not contiguous. *Stamens* few. *Stigma* broad. *Achenes* hirsute, numerous, about 30 in each head.

23. **R. circinatus** (p. 150). *Submerged leaves* suborbicular in outline, tending to remain in the horizontal plane, segments short, not collapsing when taken out of the water. *Floating leaves* absent. *Pedicels* reflexed in fruit. *Receptacle* subglobose. *Flowers* up to 2 cm. in diameter. *Petals* contiguous. *Stigma* narrow. *Achenes* rather hairy, numerous, about 30 in each head.

## 21. RANUNCULUS AQUATILIS. Water Crowfoot. Plates 153, 154, 155; 146

*R. aquatilis* Johnson in Gerard *Herball* ed. 2, 829 (1633); Ray *Syn.* ed. 3, 249 (1724).

**Ranunculus aquatilis** *L. Sp. Pl.* 556 (1753) excl. vars.!; Godron in *Mém. Soc. Roy. Nancy* 24 (1840); Koch *Syn.* ed. 2, 12 (1843); Syme *Eng. Bot.* i, 19 (1863) excl. subsp. *drouetii* p. 22 et subsp. *trichophyllus* p. 23; *R. heterophyllus*[1] Weber in Wiggers *Fl. Holsat.* 42 (1780) non Babington; Hooker fil. *Stud. Fl.* ed. 3, 5 (1884); *R. diversifolius*[2] [? Gilibert *Fl. Lithuan.* v, 262 (1782); ? Schrank *Baier. Fl.* ii, 103 (1789) incl. *R. peltatus*;] Rouy et Foucaud *Fl. France* i, 63 (1893); *R. peltatus* Schrank *Baier. Fl.* ii, 103 (1789); Babington in *Ann. Nat. Mag.* ser. 2, xvi, 398 (1855)!, incl. var. *floribundus*! p. 397; *Batrachium heterophyllum* Gray *Nat. Arr. Brit. Pl.* ii, 721 (1821); *Batrachium peltatum* Fries *Veg. Scand.* 140 (1846)!; *R. hydrocharis* form *truncatus* Hiern *op. cit.* 98 (1871) et form *floribundus*; *R. aquatilis* var. *heterophyllus* DC. *Fl. France* iv, 894 (1805) non al.; Koch *Syn.* 11 (1835) incl. var. *truncatus*; *R. diversifolius* race *peltatus* Rouy et Foucaud *Fl. France* i, 63 (1893) incl. race *truncatus* et race *floribundus*.

Icones:—Babington in *Eng. Bot. Suppl.* t. 2965, as *R. peltatus*; t. 2969, as *R. floribundus*; *Fl. Dan.* t. 2416, as *R. aquatilis*; Reichenbach *Icon.* iii, t. 3, fig. 4576, as *R. aquatilis* var. *heterophyllus subtruncatus* (top right-hand figure).

*Camb. Brit. Fl.* iii. *Plate 153.* (*a*) Flowering shoot. (*b*) Portion of fruiting branch. (*c*, *d*) Leaves out of water. (*e*) Flowers. (*f*) Petal. (*g*) Achenes (enlarged). Sussex (T. H.). This was named "form *truncatus*" by Mr Hiern. *Plate 154.* (*a*, *b*) Flowering shoots. (*c*) Leaf out of water. (*d*) Flower. (*e*) Petal (enlarged). (*f*) Receptacle, with 3 achenes. (*g*) Ovaries. (*h*) Achenes (enlarged). Kent (W. H. H.).

Exsiccata:—Fellman, 3, as *R. heterophyllus*; Fries, xii, 48, as *B. peltatum*; Todaro, 1165, as *R. aquatilis* var. *heterophyllus* (= *R. floribundus* Bab.); 1170, as *R. peltatus*; Wirtgen, vi, 217, et xix, 1055, as *B. aquatile* var. *truncatum*; *Herb. Fl. Ingric.* ix, 12, as *B. aquatile* var. *peltatum*.

Perennial. *Branches* 1—3 dm. long, or even longer in the states of deep water and quickly flowing streams. *Submerged leaves* well-developed, persistent; sheaths long, adnate; petioles usually

[1] We think it undesirable to take up this name for the present species. The name *heterophyllus* has been applied to so very many different water crowfoots that we reject it altogether as a *nomen confusum*.

[2] We are unable to see that any advantage is gained by utilising Gilibert's name for the present species. Its significance is debateable, whilst the original binominal of Linnaeus was definitely limited and fixed by Godron who has been followed by most later botanists.

short or even absent; segments usually rather long, collapsing when taken out of the water. *Floating leaves* present, except in states growing on mud, or in quickly flowing streams; laminae with 3—5 lobes, cordate to truncate at the base, lobes usually not cuneate. *Petioles* rather longer than the submerged leaves, not markedly arched in fruit. *Receptacle* usually globose, hairy. *Flowers* rather large, about 2·0—2·6 cm. in diameter; April to early July. *Petals* contiguous or nearly so. *Stamens* ∞, longer than the ovaries. *Stigma* short, broad. *Achenes* large, rather numerous, about 40 on each receptacle, rather hairy, beak short.

Mr Arthur Bennett (in Hardwick's *Science Gossip* 198 (1892) ex *Bot. Exch. Club Brit. Is., Rep. for 1892*, p. 351, cf. *Rep. for 1900*, p. 618) described a plant from Llyn Coron, Anglesey, whose relationships have never been satisfactorily determined. It is a flaccid plant with small flowers, and seems to show some affinity with *R. trichophyllus* var. *droueti*; but it has never been found in fruit. It is possibly a hybrid.

Babington described a plant which he named *R. heterophyllus* (in *Ann. Nat. Hist.* ser. 2, xvi, 393 (1855)); and the name is to be found in nearly all British lists of plants and local floras. Babington's plants, however, are a mixture, and belong largely to those states of *R. trichophyllus* which produce floating leaves. Whether, after taking the latter forms away from Babington's *R. heterophyllus*, there is any real entity left, we are unable positively to state; but we suspect not. Syme (*Eng. Bot.* i, 21 (1863)) retained Babington's *R. heterophyllus* as a subspecies, and supplied a figure (t. 19); but we refer Syme's figure to *R. triphyllus*. In the Rev. E. S. Marshall's *Suppl. Fl. Somerset* 2 (1914), it is stated that Prof. H. Glück, the eminent authority on water-plants, regards what British botanists name *R. heterophyllus* Babington as *R. radians* Revel. This is virtually our own view, for we refer *R. radians* Revel to a variety of *R. trichophyllus*.

Judging by Babington's specimens, his *R. floribundus* is merely a strong and stout form of *R. aquatilis*. Our plate 153 illustrates this form.

(*β*) forma **submersus** comb. nov.; *R. hydrocharis* form *submersus* Hiern *op. cit.* 102 (1871) partim.

Icones:—Reichenbach *Icon.* iii, t. 3, fig. 4576, as *R. aquatilis* var. *pantothrix*.

*Camb. Brit. Fl.* iii. *Plate 155.* (*a*) Fertile shoot. (*b*) Leaf out of water. (*c*) Receptacle (enlarged). (*d*) Flower-bud. (*e*) Flowers. Huntingdonshire (E. W. H.). This is a robust form growing in running water, intermediate between forma *submersus* and *R. trichophyllus* var. *tripartitus* forma *penicillatus*.

This state is destitute of floating leaves, and usually occurs in shallow water.

(*γ*) forma **pseudofluitans** comb. nov.; *R. aquatilis* subsp. *peltatus* var. *pseudofluitans* Syme *Eng. Bot.* i, 20 (1863) excl. syn. Newbould; *R. pseudofluitans* Baker and Foggitt in *Rep. Thirsk Bot. Exch. Club for 1864*, 5 (1865) non Newbould; *Batrachium aquatile* var. *rivulare* Schur *Enum. Plant. Transsilv.* 11 (1866); *R. hydrocharis* form *pseudofluitans* Hiern *op. cit.* 103 (1871); *R. diversifolius* race *pseudofluitans* Rouy et Foucaud *Fl. France* i 65 (1893).

This state of *R. aquatilis* grows in running water, and is allied to *R. trichophyllus* var. *tripartitus* forma *penicillatus*. Like the latter, when found in rapidly flowing streams, it simulates *R. fluitans*. Its achenes, which are not glabrous, afford a mark of distinction from *R. fluitans*.

*R. aquatilis* occurs in ponds, ditches, and slowly moving waters (rarely on mud or in quickly flowing streams), in waters with a high or fairly high mineral content, usually in lowland districts, from the Channel Isles, Cornwall, and Kent northwards to Ross-shire and Zetland, ascending to 310 m.; general in Ireland.

Throughout Europe; northern Africa; Asia; North America.

*R. aquatilis* × *homoiophyllus* (p. 141).

[***R. aquatilis* × *trichophyllus*** nomen; *R. peltatus* × *trichophyllus* H. and J. Groves in *Bot. Exch. Club Brit. Is. Rep. for 1901*, 4 (1902) nomen.

Specimens for which the above parentage was suggested were sent to the Botanical Exchange Club in 1901.]

## 22. RANUNCULUS TRICHOPHYLLUS. Water Crowfoot. Plates 156, 157, 158, 159, 160, 161

*R. caule fluitante petiolis unifloris foliis capillaribus laciniis divergentibus* Haller *Hist.* ii, 69, no. 1162 [excl. var. *β*] (1768).

**Ranunculus trichophyllus** Chaix in Villars *Hist. Pl. Dauph.* i, 335 (1786) partim[1], emend.; Hooker fil. *Stud. Fl.* ed. 3, 6 (1884) excl. syn. Brotero[2]; Rouy et Foucaud *Fl. France* i, 67 (1893); *R. aquatilis* var. *γ* L. *Sp.*

[1] Chaix (fide p. 310) here refers to no. 1162 of Haller's *Hist. Stirp. Helv.* ii, 69 (1768): we exclude Haller's var. *β* which is *R. circinatus*.

[2] *R. pantothrix* Brotero *Fl. Lusit.* ii, 375 (1804) includes *R. fluitans* and *R. circinatus* as well as *R. trichophyllus*.

*Pl.* 556 (1753) partim (cf. Williams in *Journ. Bot.* xlvi, 11 (1908)); *R. aquatilis* Weber in Wiggers *Fl. Holsat.* 42 (1780); *R. divaricatus* Schrank *Baier. Fl.* ii, 104 (1789)[1]; *R. aquatilis* var. *diffusus* Withering *Arr. Brit. Pl.* ed. 3, ii, 507 (1796); *R. pantothrix* var. *capillaceus* DC. *Syst. Nat.* i, 235 (1818); *Batrachium pantothrix* Gray *Nat. Arr.* ii, 722 (1821) excl. syn. Brotero.

Perennial. *Shoot* usually elongate, often rather hairy above. *Submerged leaves* often rather short, up to about 6—7 cm. long; sheaths usually auricled, adnate below; petioles usually short or absent; primary leaf-divisions usually stalked; ultimate divisions rather short, linear or capillary, spreading, collapsing or not when taken out of the water. *Pedicels* shorter than in *R. aquatilis*, not tapering, usually about as long as or a little shorter than the leaves. *Receptacle* hairy, subglobose or a little longer than broad. *Flowers* small, 1—2 cm. or rather more in diameter; late April to June. *Petals* not or scarcely contiguous, about 1·5—2·0 times as long as the sepals. *Stamens* about 10—15, longer than the ovaries. *Stigma* broad. *Achenes* up to about 30, hairy, beaked.

Although, in dried examples, var. *rigidus* and var. *droueti* are often difficult to determine, and although we frequently meet in nature with plants intermediate between the two, yet in many of the ditches of the fenny parts of Cambridgeshire we find the two plants growing side by side and remaining distinct: in such places, we have noticed that var. *droueti* comes into flower two to four weeks earlier than var. *rigidus*.

In the fresh state, the two varieties are most readily distinguished by the stiff leaves of var. *rigidus*, which do not collapse when taken out of the water, and the flaccid leaves of var. *droueti*, which readily collapse under the same conditions. It has been suggested that this character of the leaf-segments is due to the mineral-content of the water in which the plants grow: it is said that var. *rigidus* prefers calcareous water, and var. *droueti* non-calcareous water, "so that in the former the leaf-segments remain more or less divergent, and in the latter they collapse together, when the plant is withdrawn from the water" (Williams *op. cit.* p. 48). We are unable to endorse this suggestion, as both varieties are locally abundant in the calcareous waters of Cambridgeshire, and often occur together in the same ditch. We suspect some structural difference is the cause of the rigidity and the flaccidity of the leaf-segments of the respective varieties.

(*a*) **R. trichophyllus** var. **tripartitus** Koch *Syn.* 11 (1835); *R. petiveri* var. *major* Koch *Syn.* ed. 2, 14 (1843); *R. radians* Revel in *Act. Soc. Linn. Bordeaux* xix, 120, fig. 1 (1853); *R. heterophyllus* Babington in *Ann. Nat. Hist.* ser. 2, xvi, 393 (1855) et auct. angl., pro max. parte; *R. trichophyllus* race *radians* Rouy et Foucaud *Fl. France* i, 67 (1893); *Batrachium diversifolium* Corbière[2] *Fl. Normand.* 20 (1893).

Icones:—Sturm *Deutschl. Fl.* t. 82. 2, as *R. petiveri*.

In our note in the *Journal of Botany* for 1914, we referred (pp. 116—117) the above figure to *R. obtusiflorus*: we now think it is better placed as above, on account of its hairy achenes.

*Camb. Brit. Fl.* iii. *Plate 156.* (*a*) Flowering branch. (*b*) Submerged leaf. (*c*) Receptacle and pedicel. (*d*) Flower. (*e*) Petals. (*f*) Achenes (two enlarged). Huntingdonshire (E. W. H.). *Plate 157.* (*a*) Flowering branch. (*b*) Submerged leaf. (*c*) Flower. (*d*) Petal (one enlarged). (*e*) Ovaries. (*f*) Achenes (enlarged). Huntingdonshire (E. W. H.).

Exsiccata:—Billot, 1102, as *Batrachium godroni*; 2803, as *R. godroni* (corrected later to *R. radians*); Fries, xv, 28, as *B. confusum*; Schultz (*Fl. Gall. et Germ.*), 1202, as *R. godroni*; Schultz et Winter (*H. N.*), i, 6, as *B. langii*; *Fl. Austr.-Hung.*, 1705, as *R. paucistamineus* var. *heterophyllus*; *Herb. Fl. Ingric.*, 13 *b*, as *R. aquatilis* var. *truncatus*.

This is the heterophyllous form of *R. trichophyllus*, with floating leaves which are divided deeply or even into 3 cuneate segments, the middle segment often being stalked. It is sometimes mistaken for *R. triphyllus*, and sometimes for *R. obtusiflorus*.

We have seen specimens of this var. *tripartitus* from Cambridgeshire, Warwickshire, Staffordshire, and Lancashire; and it doubtless occurs elsewhere. It is widespread in Europe.

(*β*) var. **tripartitus** forma **penicillatus** comb. nov.; *Batrachium penicillatum* Dumortier in *Bull. Soc. Roy. Bot. Belg.* ii, 216 (1863); *R. pseudofluitans* Newbould in *Thirsk Bot. Exch. Club Rep. for 1864*, 5 (1865); in Babington *Man.* ed. 6, 7 (1867); non Baker and Foggitt; *R. hydrocharis* form *penicillatus* Hiern *op. cit.* 98 (1871); *R. penicillatus* Babington *Man.* ed. 7, 7 (1879); *R. diversifolius* race *penicillatus* Rouy et Foucaud *Fl. France* i, 64 (1893).

Icones:—*Camb. Brit. Fl.* iii. *Plate 158.* (*a*, *b*) Flowering shoots. (*c*, *d*) Leaves out of water. (*e*) Flower. (*f*) Achenes (enlarged). Devonshire (W. P. H.).

*Submerged leaves* with laminae 2—6 times as long as the petioles; segments long, capillary,

[1] Schrank's diagnosis is very meagre; but he cites Haller *op. cit.* no. 1162, just as Chaix (*loc. cit.*) does in founding his *R. trichophyllus*. It is legitimate therefore to refer *R. trichophyllus* Chaix and *R. divaricatus* Schrank to the same plant: in fact we do not see that any other course is defensible.

[2] Corbière here cites the name as of Hiern; but we do not know where Hiern described a plant of that name.

often nearly parallel. *Floating leaves* usually not produced until about midsummer or even later, often few, lobes deeply and variously divided.

This is a form growing in running water. When growing in quickly flowing streams, it simulates *R. fluitans*; but its flowers are smaller, and its achenes are not glabrous.

(*b*) **R. trichophyllus** var. **rigidus** var. nov.; *R. trichophyllus* Godron in Grenier et Godron *Fl. France* i, 23 (1848); Babington in *Ann. Nat. Hist.* ser. 2, xvi, 390 (1855); *R. aquatilis* var. *trichophyllus* Babington *Man.* ed. 3, 5 (1851); *R. aquatilis* subsp. *trichophyllus* Syme *Eng. Bot.* i, 23 (1863); *R. hydrocharis* form *trichophyllus* Hiern *op. cit.* 101 (1871); *R. trichophyllus* race *trichophyllus* Rouy et Foucaud *Fl. France* i, 68 (1893).

*Segments of the submerged leaves* not collapsing when taken out of the water. *Floating leaves* absent. *Flowers* larger than in var. *droueti*, appearing a fortnight later.

This variety connects *R. aquatilis* and *R. circinatus.*

(*β*) var. **rigidus** forma **isophyllus** comb. nov.

Icones :—*Fl. Dan.* t. 2357, as *R. aquatilis* var. *phellandriifolius*; Babington in *Eng. Bot. Suppl.* t. 2968, as *R. trichophyllus.*

*Camb. Brit. Fl.* iii. *Plate 159.* (*a*) Fertile branch. (*b*) Leaf out of water. (*c*) Upper part of stem (enlarged). (*d*) Flower-bud. (*e*) Flower. (*f*) Receptacle (enlarged). (*g*) Achenes (enlarged). Huntingdonshire (E. W. H.).

Exsiccata :—Crépin (in Herb. Univ. Cantab.), as *B. aspergillifolium* (a form with crowded and numerous leaf-segments); Fries, ix, 29, as *B. circinatum*; xiii, 45 as *B. confervoides* (a small form); v. Heurck, ii, 51, as *R. divaricatus*; Lloyd herb., as *R. capillaceus*; Tausch (*Pl. Sel. Fl. Böh.*), as *R. paucistamineus* (a small form); Todaro, 1171, as *R. trichophyllus*; *Herb. Fl. Ingric.*, vii, 13, as *B. circinatum.*

(*γ*) var. **rigidus** forma **terrestris** nobis.

Exsiccata :—Billot, 1203, as *B. trichophyllum* var. *terrestre.*

This is the mud-form of the variety, and is not very rare on mud thrown out of ponds, ditches, and rivers. In summers of drought, it is sometimes met with in dry stream-beds.

The var. *rigidus* occurs throughout the British Isles, as far north as Orkney.

Europe.

(*c*) **R. trichophyllus** var. **droueti** Loret in Loret et Barrandon *Fl. de Monsp.* 792 (1876); *R. paucistamineus* Tausch in *Flora* xvii, ii, 525 (1834); F. Schultz in *Arch. Fl.* i, 10 (1842); *R. droueti* [Schultz ex] Grenier in Grenier et Godron *Fl. France* i, 24 (1848)!; Babington in *Ann. Nat. Hist.* ser. 2, xvi, 391 (1855)!; *R. aquatilis* subsp. *droueti* Syme *Eng. Bot.* i, 22 (1863); *R. hydrocharis* form *droueti* Hiern *op. cit.* 102 (1871); *R. trichophyllus* race *droueti* Rouy et Foucaud *Fl. France* i, 69 (1893).

Icones :—Babington in *Eng. Bot. Suppl.* t. 2967, as *R. droueti.*

*Submerged leaves* with segments collapsing when taken out of the water. *Flowers* smaller than in var. *rigidus.*

This is the first member of the series *Aquatiles* to come into flower in the ponds and ditches of the Fen District, where it is locally abundant.

(*a*) var. **droueti** forma **diversifolius** nobis; *Batrachium godroni*[1] Grenier in Schultz *Arch. Fl.* 172 (1850)?, nomen; Grenier *Rev. Fl. Mont. Jura* 25 (no date)?, nomen; *R. hydrocharis* form *godroni* Hiern *op. cit.* 99 (1871).

A number of Babington's specimens of his *R. heterophyllus*, in Herb. Univ. Cantab., belong to this forma (see also p. 147).

This is the heterophyllous state of *R. trichophyllus* var. *droueti.* Some of Babington's specimens of his *R. heterophyllus* belong to this forma *diversifolius.*

(*β*) var. **droueti** forma **isophyllus** nobis.

Icones :—Babington in *Eng. Bot. Suppl.* t. 2967 (lower figure), as *R. droueti.*

*Camb. Brit. Fl.* iii. *Plate 160.* (*a*) Fertile branch. (*b*) Leaf out of water. (*c*) Flower-buds (one enlarged). (*d*) Flowers (one enlarged). (*e*) Petals (enlarged). (*f*) Ovaries (enlarged). (*g*) Receptacle (enlarged). (*h*) Achenes (enlarged). Devonshire (W. P. H.).

Exsiccata :—Billot, 2606, as *R. trichophyllus*; Schultz (*Fl. Gall. et Germ.*), 805 bis, as *B. trichophyllum*; Wirtgen, ix, 435, as *B. trichophyllum*; *Fl. Sequan. Exsicc.*, 1, as *R. paucistamineus.*

This is the submerged form of the var. *droueti*, without floating leaves: it is by far the commonest form of the variety in the British Islands.

[1] It is usual to refer this name to the present *forma*; but, as there is no available description, the matter must remain doubtful.

(γ) var. **droueti** forma **subaquaneus** comb. nov.; *R. aquatilis* var. *subaquaneus* Wahlenberg *Fl. Suec.* ed. 2, ii, 1091 (1833); *Batrachium aspergillifolium* Dumortier 218 (1863); *R. trichophyllus* var. *confervioïdes* Hooker fil. *Stud. Fl.* ed. 3, 6 (1884); *R. trichophyllus* var. *demersus* N. E. Brown in *Eng. Bot.* ed. 3, suppl., 12 (1891).

Icones :—*Camb. Brit. Fl.* iii. *Plate 161.* (*a*) Portion of plant. (*b*) Flower-buds (one enlarged). (*c*) Flowers (three enlarged). (*d*) Head of achenes (enlarged). (*e*) Achenes (enlarged). Forfarshire (R. H. C.).

This is a small and slender plant, with narrow stipuloid sheaths, wholly submerged : it flowers and fruits under water.

According to Sir J. D. Hooker (*Stud. Fl.* ed. 3, p. 6), this "is the original *R. aquatilis* of Linnaeus's *Flora Lapponica*." It has, however, no claim to be regarded as the type of the *Spec. Plant.* The plant occurs in lochs in Perthshire, Forfarshire (e.g., Loch Rescobie, from which fresh specimens were kindly sent to us by Mr and Mrs Corstorphine, of Arbroath), and probably elsewhere in central and northern Scotland. The plants sent by the Corstorphines were almost destitute of stamens : is this their normal state? Judging from descriptions, it would appear to occur in Scandinavia, Belgium, and France.

Possibly *R. aquatilis* var. *cambricus* Ar. Bennett is allied to this variety ; but, until fruits of Mr Bennett's plant have been found, it is scarcely possible to offer any definite opinion on the matter.

(δ) var. **droueti** forma **lutosus** nobis.

This is the mud-form or land-form of the var. *droueti*, and is not rare when the requisite habitat-conditions prevail. We have several times observed it in Cambridgeshire when the fen-ditches have recently been cleaned, and the mud thrown on the banks. It is, of course, almost impossible to distinguish it morphologically from the corresponding state of the var. *rigidus*.

The var. *droueti* occurs throughout the British Isles, as far north as Orkney.

Cosmopolitan.

*R. trichophyllus* occurs in ponds and ditches, usually with a high mineral content; locally abundant from the Channel Isles, Cornwall, and Kent northwards to Orkney; common in the ditches of the Fen District, ascending to 300 m. in Perthshire; Ireland.

Iceland, Scandinavia (northwards to 70° 15′ N.), Denmark, Germany, ? Holland, Belgium, France, central Europe (ascending to 2580 m.), ? Russia, southern Europe; northern Africa; Asia; North America; Tasmania (? indigenous).

*R. aquatilis* × *trichophyllus* (cf. p. 147).

[***R. obtusiflorus* × *trichophyllus*** nomen; *R. baudoti* × *droueti* H. and J. Groves in *Bot. Exch. Club Brit. Is., Rep. for 1893*, i, 398 (1894) nomen; Hanbury and Marshall *Fl. Kent* 8 (1899) nomen; J. Groves in *Bot. Exch. Club Brit. Is., Rep. for 1901*, i, 4 (1902) nomen.

Specimens for which the above parentage was suggested were sent to the British Botanical Exchange Club as above.]

## 23. RANUNCULUS CIRCINATUS. Plate 162

*R. aquaticus albus circinatus tenuissime diversis foliis floribus ex alis longis pediculis innixis* Ray *Syn.* ed. 3, 249 (1724).

**Ranunculus circinatus** Sibthorp *Fl. Oxon.* 175 (1794) excl. syn. L.[1]; Babington in *Ann. Nat. Hist.* ser. 2, xvi, 401 (1855)!; Syme *Eng. Bot.* i, 16 (1863); *R. aquatilis* var. β L. *Sp. Pl.* 556 (1753); *R. aquatilis* Weber in Wiggers *Fl. Holsat.* 42 (1780) partim, non Godron; *R. foeniculaceus*[2] [Gilibert *Fl. Lithuan.* v, 261 (1782);] Rouy et Foucaud *Fl. France* i, 70 (1893); *R. aquatilis* var. *circinatus* Withering *Arr. Brit. Pl.* ed. 3, ii, 507 (1796); *R. aquatilis* var. γ Smith *Fl. Brit.* 596 (1800)!; *R. stagnatilis* Wallroth *Sched. Crit.* 285 (1822); *R. hydrocharis* form *circinatus* Hiern *op. cit.* 99 (1871).

Icones :—Babington in *Eng. Bot. Suppl.* t. 2869; *Fl. Dan.* t. 2236; Reichenbach, iii, t. 2, t. 4575.

*Camb. Brit. Fl.* iii. *Plate 162.* (*a—c*) Fertile branches. (*d*) Flower. (*e*) Achenes (enlarged). Cambridgeshire (E. W. H.).

Exsiccata :—Billot, 901, as *R. divaricatus*; Wirtgen, ix, 434, as *B. divaricatum*; xiii, 728, as *B. divaricatum* var. *grandiflorum*; Woloszczak, 606.

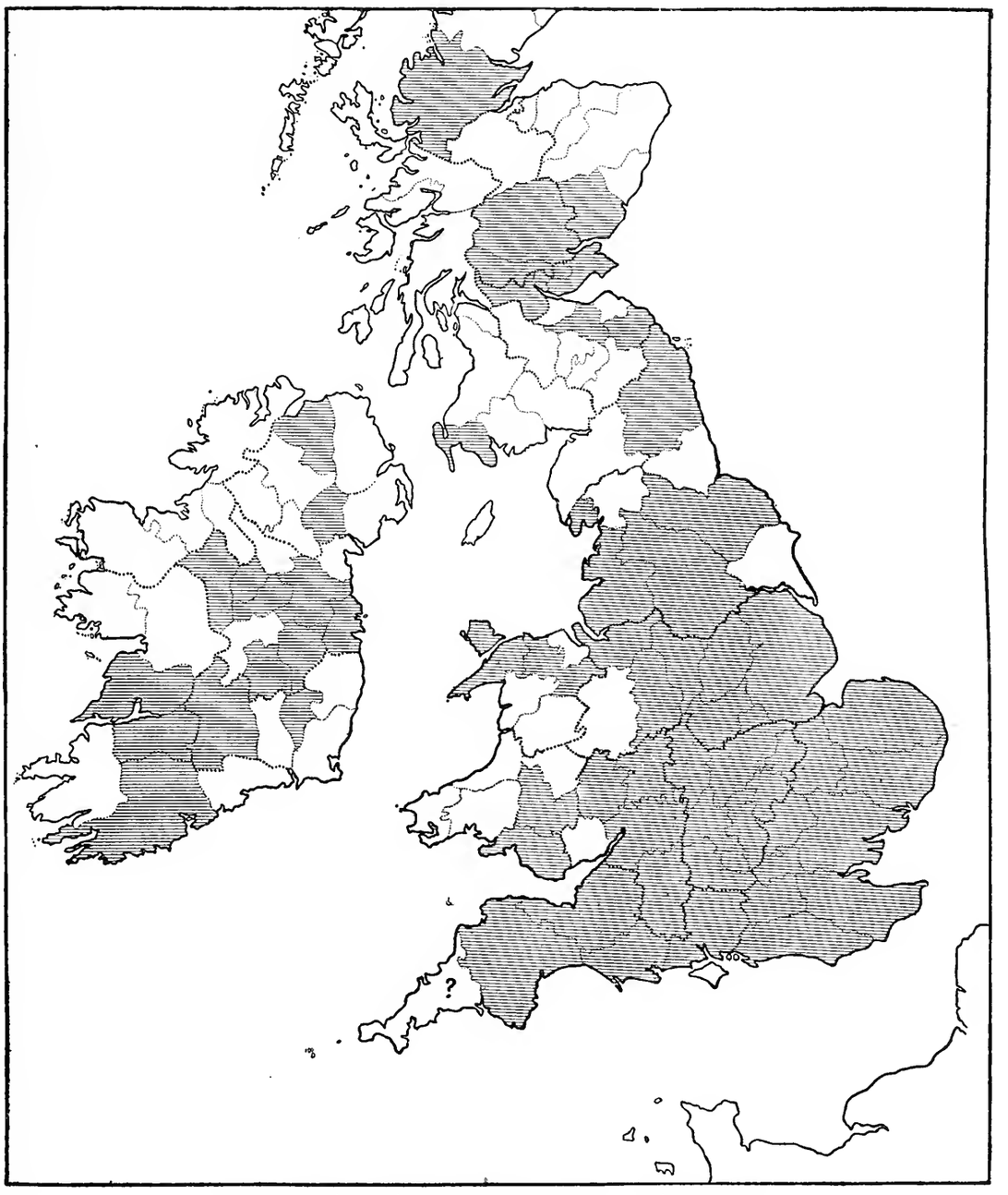
Perennial. *Shoot* remaining evergreen throughout the winter. *Branches* usually all submerged, erect or suberect, 1—5 dm. long, lower internodes usually very long. *Submerged leaves* divaricate, sessile, lower ones persisting throughout the winter; sheaths, small, appressed, not auricled, subciliate,

[1] As pointed out by Williams (in *Journ. Bot.* xlvi, 15 (1908)), it is obvious that by "var. γ L." Sibthorp meant "var. β L.," as shown by his reference to Ray and therefore by implication to Plukenet's figure in *Almag. Bot.*

[2] "Habitus praecedentis [*R. peucedanifolius* Gilibert = *R. fluitans*], sed foliola capillacea divergentia, breviora, et flos minor" (Gilibert *loc. cit.*).

caducous; laminae suborbicular in general outline, rigid, tending to remain in the horizontal plane, not collapsing when taken out of the water, about 2—3 cm. in diameter. *Floating leaves* absent. *Pedicels* rather slender, much longer than the leaves, up to about 3·5 cm. long. *Receptacle* subglobose, hirsute. *Flowers* up to 2 cm. in diameter; late May to early August. *Sepals* ultimately reflexed. *Petals* 2—3 times as long as the sepals, usually contiguous or nearly so. *Stamens* about 15—20, longer than the ovaries. *Stigma* narrow. *Achenes* about 30—35, rather hirsute.

This is one of the most easily distinguished species of the series *Aquatiles*; yet it is frequently confused with *R. trichophyllus* var. *rigidus*.



Map 59. Distribution of *R. circinatus* in the British Islands

(*β*) forma **terrestris** nobis; *R. divaricatus* var. *terrestris* Grenier et Godron *Fl. France* i, 25 (1848); *R. foeniculaceus* var. *terrestris* Rouy et Foucaud *Fl. France* i, 71 (1893).

This is the mud-form of the species.

In slowly moving and rather deep rivers with a high mineral-content; from Devonshire and Kent northwards to Perthshire and Ross-shire, but rare in Scotland; Ireland—chiefly in the east.

Scandinavia (excl. northern), Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; Asia; North America.

## Family 4. **ACTAEACEAE**

**Actaeaceae** nobis; *Actaeëae* Rouy et Foucaud *Fl. France* i, 54 (1893); Corbière *Fl. Normand.* 26 (1893).

Perennial herbs. *Inflorescence* a raceme, petaloid. *Flowers* small, numerous, actinomorphic, heterochlamydeous. *Sepals* 3—5, subequal, petaloid. *Petals* 3—10; usually white, small, flat. *Stamens* ∞, hypogynous, anthers introrse. *Carpel* 1. *Fruit* indehiscent, succulent. *Seed* sessile, dilated.

This family connects the tribe *Helleboreae* of the family *Ranunculaceae* and the family *Berberidaceae.*

Only British genus:—*Actaea.*

## Genus 1. Actaea

**Actaea** L. [*Gen. Pl.* 151 (1737);] *Sp. Pl.* 504 (1753) et *Gen. Pl.* ed. 5, 222 (1754) partim; Miller *Gard. Dict.* ed. 8 (1768); Bentham and Hooker *Gen. Pl.* i, 9 (1862); Prantl *op. cit.* 56 et 59 (1891); excluding *Cimicifuga* (L.) et *Macrotrys* (Rafin.). [*Christophoriana* Tournefort *Inst.* 299 (1700).]

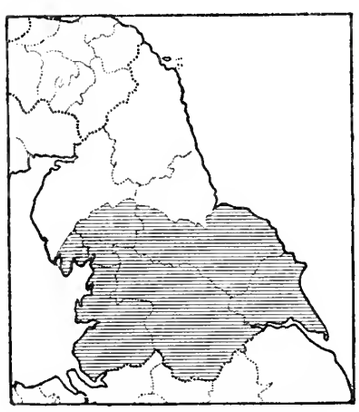
Perennial herbs, with rhizomes. *Leaves* alternate, with stipuloid sheaths, petiolate; laminae pinnate or ternate; lobes ovate, toothed. *Inflorescence* racemose. *Sepals* 3—5, usually 4, petaloid, white, caducous. *Petals* 4—10, usually 4, white, flat, smaller than the sepals, slightly clawed, without nectaries. *Stamens* ∞, anthers introrse, filaments white. *Carpels* 1 to each flower, ovules ∞, style absent, placentation lateral and in 2 rows. *Fruit* succulent, indehiscent. *Seeds* ∞, flattened, testa thick and smooth.

2 species; north temperate zone. Only British species:—*A. spicata.*

### 1. **ACTAEA SPICATA.** Herb Christopher or Baneberry. **Plate 163**

*Christophoriana* Gerard *Herball* 829 (1597); Ray *Syn.* ed. 3, 262 (1724).

**Actaea spicata** L. *Sp. Pl.* 504 (1753) excl. var. *alba*; Miller *Gard. Dict.* no. 1 (1768); Smith *Fl. Brit.* 562 (1800); Syme *Eng. Bot.* i, 67 (1863); Rouy et Foucaud *Fl. France* i, 54 (1893); *A. spicata* var. *nigra* L. *loc. cit.*



Map 60. Distribution of *Actaea spicata* in England

Icones:—Smith *Eng. Bot.* t. 918; *Fl. Dan.* t. 498; Reichenbach *Icon.* t. 121, fig. 4739.

*Camb. Brit. Fl.* iii. *Plate 163.* (*a*) Lower part of plant. (*b*) Upper part of plant. (*c*) Flowering branch. (*d, e*) Flowers. (*f*) Sepals (2 enlarged). (*g*) Petals (2 enlarged). (*h*) Infructescence. Hort., origin West Riding of Yorkshire (S. H. B.).

Exsiccata:—*Herb. Fl. Ingric.* i, 28.

Perennial. *Rhizome* rather short and stout. *Shoot* glabrous or almost so, 3—8 dm. high. *Stem* simple, rarely branched, leafless below, 1—4 leaves above. *Leaves* with petioles shorter than the laminae; lateral pinnae of the laminae shortly stalked, terminal one with a long stalk; pinnules incise-dentate. *Raceme* 3—5 cm. long, with numerous flowers. *Pedicels* about as long as the flowers, pubescent. *Flowers* about 1—2 cm. in diameter; late May to July. *Sepals* 4, whitish. *Petals* 4 (rarely 0), white, spathulate, narrower than the sepals. *Stamens* ∞; filaments widening a little above. *Fruit* purplish black (in the known British wild examples), elliptical, about 9 mm. long and 2 broad.

Very local; in ash woods and scrub on calcareous soils in the East, West, and North Ridings of Yorkshire, in Lancashire, and in Westmorland; introduced in some of its recorded stations, as at Cleish Castle, Kinross-shire.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe (ascending to 1600 m.), Russia, Spain, Italy; Asia. The allied *A. alba* Miller *loc. cit.* occurs in North America.

## Family 5. BERBERIDACEAE

**Berberidaceae** Lindley (as *Berberaceae*) *Nat. Arr.* 29 (1836); Prantl in *Pflanzenfam.* iii, pt. 2, 70 (1891); *Berberideae* Jussieu *Gen. Pl.* 286 (1789); Ventenat *Tabl.* iii, 83 (1799).

Shrubs or perennial herbs. *Leaves* radical or alternate, compound, sometimes apparently simple. *Inflorescence* terminal or axillary. *Flowers* bracteate. *Sepals* $n+n$, these constituting the primitive perianth, petaloid, caducous, imbricate in bud. *Petals* $n+n$, usually with nectaries near the base on the inside, imbricate in bud. *Stamens* $n+n$, hypogynous, antipetalous. ($n=3$ or 2.) *Anthers* adnate, introrse, usually opening by "valves" at the back (cf. *Lauraceae*), but the "valve" with its pollen moves upwards and round so that the pollen eventually faces the centre of the flower. *Ovary* superior, of 1 carpel, unilocular; stigma orbicular. *Ovules* 1—∞, if few basal, if ∞ ventral. *Fruit* either a berry or dry and dehiscent. *Embryo* straight or nearly so. *Radicle* pointing towards the hilum. *Endosperm* copious. *Cotyledons* short.

9 genera and about 100 species; extra-tropical Europe, N. Africa, Asia, and N. America.

### British genera of *Berberidaceae*

Genus 1. **Berberis** (see below). Shrubs or undershrubs, with spines or prickly leaves. *Inflorescences* on short lateral shoots. *Flowers* trimerous. *Fruit* a berry, 1—3-seeded.

Genus 2. ***Epimedium** (p. 154). Herbs. *Inflorescences* terminal. *Flowers* dimerous. *Fruit* dry, dehiscent.

## Genus 1. Berberis

**Berberis** [Tournefort *Inst.* 614, t. 385 (1700);] L. *Sp. Pl.* 330 (1753) et *Gen. Pl.* ed. 5, 153 (1754); Prantl *Pflanzenfam.* iii, pt. 2, 74 et 77 (1891).

Spiny shrubs. *Stem* with yellow wood. *Leaves* of the long shoots often modified into spines which are usually branched, of the short shoots foliar and petioled. *Bracteoles* 3, alternating with and smaller than the outer whorl of sepals. *Flowers* trimerous. *Petals* each with 2 nectaries near the base. *Stamens* irritable. *Style* absent. *Stigma* peltate. *Ovules* few, basal, erect. *Fruit* a berry, ovate to subspherical, with 1 or 2 seeds. *Seeds* elliptical. *Testa* crustaceous. *Embryo* large.

### British species of *Berberis*

1. ***B. aquifolia** (see below). *Branches* without leaf-spines. *Laminae* pinnate, pinnae prickly. *Raceme* terminal. *Flowers* nodding. *Petals* bidentate at the apex.

2. **B. vulgaris** (see below). *Branches* with leaf-spines. *Laminae* apparently simple, pinna not prickly. *Racemes* lateral, drooping. *Flowers* spreading. *Petals* entire.

### 1. *BERBERIS AQUIFOLIA

**Berberis aquifolia** Pursh *Fl. Amer. Sept.* i, 219, t. 4 (1814); *Mahonia aquifolia* Nuttall *Gen. North Amer. Pl.* i, 212 (1818); Fedde in Engler's *Bot. Jahrb.* xxxi, 84 (1902); Tischler in Engler's *Bot. Jahr.* xxxii, 642 (1902).

Icones:—Lindley in *Bot. Reg.* xvii, t. 1425.

Exsiccata:—Fendler (*Pl. Nov.-Mex.*), 14.

Undershrub, with evergreen shiny leaves. *Laminae* pinnate; pinnae sessile, oblong-ovate, margin spinose-dentate, apex rather acute; usually copper-coloured, especially in spring. *Raceme* terminal, many-flowered. *Flowers* nodding; March to May. *Sepals* petaloid, 6, spreading, the 3 outer ones smaller than the 3 inner ones, dark red outside, yellow inside. *Petals* yellow, 6, bidentate at the apex.

Naturalised in shrubberies and hedgerows, especially in the lowlands of southern and central England.

North America (western).

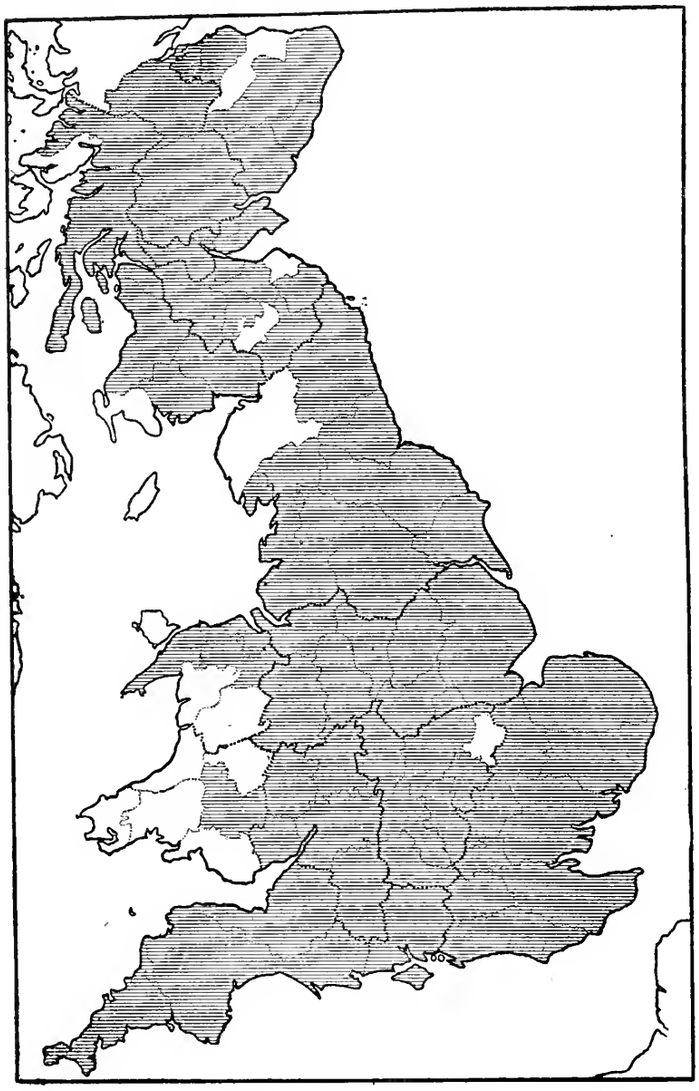
### 2. BERBERIS VULGARIS. Barberry. Plate 164

*Spina acida sive oxyacantha* Gerard *Herball* 1144 (1597); *B. dumetorum* Ray *Syn.* ed. 3, 465 (1724).

**Berberis vulgaris** L. *Sp. Pl.* 330 (1753); Smith *Eng. Bot.* no. 49 (1792); *Fl. Brit.* 387 (1800); Syme *Eng. Bot.* i, 71 (1863); Rouy et Foucaud *Fl. France* i, 147 (1893); Tischler in Engler's *Bot. Jahrb.* xxxi, 605 (1902).

Icones:—Smith *Eng. Bot.* t. 49; *Fl. Dan.* t. 904; *Sv. Bot.* t. 24; Reichenbach *Icon.* iii, t. 18, fig. 4486.

*Camb. Brit. Fl.* iii. *Plate 164.* (*a*) Winter-twig. (*b*) Barren branch. (*c*) Flowering branch. (*d*) Fruiting branch. *a*, *b*, and *c* from Cambridgeshire (A. S. S.): *d* from Somerset (E. W. H.).



Map 61. *Berberis vulgaris* has been recorded for the counties which are shaded, but its natural limits can scarcely now be ascertained

Exsiccata :—Billot, 1408; Reichenbach, 1970, as *B. vulgaris* var. *heterophyllus*; Thielens et Devos, ii, 102; *Herb. Fl. Ingric.*, viii, 29.

Small shrub, up to about 2 m. high. *Bark* ashen-grey. *Leaf-spines* usually trifurcate except towards the apex of the branches, on the mature long shoots. *Foliar-leaves* on the short shoots, with a short petiole, the lateral leaflets suppressed; the remaining terminal leaflet oboval, margin serrate, serratures rather bristly, obtuse, up to about 4 cm. long and 1·5 broad, those of the young wood alternate, showing transitional stages to spines. *Inflorescence* lateral, with about 8—16 flowers, drooping. *Pedicels* a little longer than the flowers. *Flowers* spreading, about 1 cm. in diameter when expanded, faintly odorous; June. *Petals* yellow, with 2 orange-coloured glands at the base, entire. *Stamens* sensitive. *Stigma* sessile, wider than the ovary. *Berries* about 1 cm. in diameter, orange-red to red or entirely red, with a sour taste.

In many parts of the country, as, for example, in Cambridgeshire, the barberry is less abundant than formerly. It was largely extirpated in the late eighteenth and nineteenth centuries when it was imagined that the rust (*Puccinia graminis*) of wheat had of necessity to pass through one of its stages on its leaves. However, the rust, as is now known, may complete a life-cycle without the intervention of the barberry; and so the destruction of that plant was of little or no avail in keeping down the disease.

Hedgerows, thickets, and borders of woods; throughout England, where it is perhaps indigenous in the south; recorded also for Wales and Scotland where it is probably not indigenous; not indigenous in Ireland.

Scandinavia, Denmark, Holland, Belgium, France, central Europe, Russia (central and southern), southern Europe; Asia; North America (introduced).

## Genus 2. *Epimedium

**Epimedium** [Tournefort *Inst.* 232, t. 117 (1700);] L. *Sp. Pl.* 117 (1753) et *Gen. Pl.* ed. 5, 53 (1754); Prantl *Pflanzenfam.* iii, pt. 2, 74 et 75 (1891).

Herbs with sympodial rhizomes. *Leaves* pinnate, ternate, or biternate. *Petals* (or nectaries) antisepalous. *Flowers* dimerous, protogynous. *Style* nearly as long as the ovary. *Stigma* small. *Ovules* ∞, in 2 rows along the ventral suture. *Fruit* a capsule. *Seeds* large, with the raphe much enlarged towards the base. *Embryo* slightly curved.

About 11 species; Europe; Asia; northwestern Africa.

### 1. *EPIMEDIUM ALPINUM. Plate 165

*Epimedium* Gerard *Herball* 389 (1597).

**Epimedium alpinum** L. *Sp. Pl.* 117 (1753); Smith *Eng. Bot.* no. 438 (1797); *Fl. Brit.* 187 (1800); Syme *Eng. Bot.* i, 73 (1863); Tischler *op. cit.* 650.

Icones :—Smith *Eng. Bot.* t. 438; Sibthorp et Smith *Fl. Graec.* ii, t. 150; Reichenbach *Icon.* iii, t. 18, fig. 4485.

*Camb. Brit. Fl.* iii. *Plate 165.* (*a*) Barren branch. (*b*) Flowering branch. (*c*, *d*, *e*, *f*) Flowers. Cumberland (L. B.).

Exsiccata :—Reichenbach, 1283 ; Thielens et Devos, ii, 103.

Perennial, rhizomatous herb. *Shoot* about 3 dm. high. *Stem-leaves* 2-ternate or 3-ternate ; leaflets stalked, ovate, deeply cordate at the base, margin spinulose-serrate, apex acute to acuminate. *Inflorescence* erect. *Peduncles* and *pedicels* hairy-glandular. *Flowers* about 1 cm. in diameter ; May. *Sepals* greenish. *Petals* reddish, smaller than the sepals. *Seeds* large, deep reddish in colour, raphe swollen.

Naturalised in Bingley Woods, West Riding of Yorkshire ; in Westmorland ; on Carrick Fell and Skiddaw, in Cumberland ; at Mugdoch Castle, Glasgow ; and at Cleish Castle, Kinross-shire.

Naturalised in Germany, Belgium, and France ; indigenous in east-central and south-eastern Europe.

## Family 6. *PAEONIACEAE

**Paeoniaceae**[1] Worsdell in *Journ. Bot.* xlvi, 116 (1908) ; in *Ann. Bot.* xxii, 663 (1908) ; descr. Lat. nulla ; *Paeoniëae* [Bernhardi in *Linnaea* viii, 452 (1833) emend. (excl. *Caltha* and *Actaea*) ; Bentham and Hooker *Gen. Pl.* i, 3 and 10 (1862) ; Prantl in *Pflanzenfam.* iii, pt. 2, 54 (1891).

Undershrubs or perennial herbs. *Leaves* exstipulate, alternate, rather thick. *Bracts* passing gradually into the sepals. *Flowers* dichlamydeous. *Sepals* spirally arranged, herbaceous, 1—2 outer ones bracteoid. *Petals* large and strong, spirally arranged. *Stamens* ∞ , spirally arranged. *Carpels* 2—5, in a single whorl, multiovulate, thick, joined to the disc. *Fruit* a group of follicles. *Seeds* large, red or black ; endosperm copious, oily.

Worsdell (*Journ. Bot.* xlvi, 114—116 (1908) ; *Ann. Bot.* xxii, 651—682 (1908)) proposed to take *Paeonia* out of *Ranunculaceae* and place it in a monotypic family, the *Paeoniaceae*. In particular, he shows that the anatomy of *Paeonia* differs from that of the rest of the *Ranunculaceae*. He concludes that "the characters of *Paeonia*, apart from those of the vascular anatomy, are clearly at all points intermediate between those of *Ranunculaceae* on the one hand, and those of *Magnoliaceae* and *Calycanthaceae* on the other." *Paeonia* and *Actaea* (and the allied genera) being taken out of the *Ranunculaceae*, that family becomes a very natural group, the *Ranunculaceae verae* of de Candolle (*Syst. Nat.* i, 129 (1818)).

Only genus :—**Paeonia*.

## Genus 1. *Paeonia

**Paeonia** [Tournefort *Inst.* 273, t. 146 (1700) ;] L. *Sp. Pl.* 530 (1753) et *Gen. Pl.* ed. 5, 235 (1754) ; Prantl *op. cit.* 54 et 55 (1891).

Perennial shrubs or herbs. *Laminae* compound, leaflets broad. *Sepals* 5, unequal in size, green, persistent. *Petals* 5—10, usually about 5, without nectary. *Stamens* ∞ , hemiperigynous ; anthers extrorse, on a hypogynous disc. *Carpels* 2—5, surrounded by a disc. *Follicles* often very pubescent.

15 species ; temperate northern hemisphere.

### 1. *PAEONIA MASCULA. Paeony. Plate 166

*Paeonia mas* Gerard *Herball* 830 (1597) ; *P. simplex latiore folio trifido* Morison *Plant. Hist.* iii, 454, t. 1 (sect. 12), fig. 1 (1699).

**Paeonia mascula** Miller *Gard. Dict.* ed. 8, no. 1 (1768) ; *P. officinalis* var. *mascula* L. *Sp. Pl.* 530 (1753) ; *P. corallina* Retzius *Observ.* iii, 34 (1783) ; Smith *Eng. Bot.* no. 1513 (1805) ; Syme *Eng. Bot.* i, 68 (1863) ; *P. corallina* race *corallina* Rouy et Foucaud *Fl. France* i, 14 (1893).

Icones :—Smith *Eng. Bot.* t. 1513, as *P. corallina* ; Reichenbach *Icon.* iv, t. 128, fig. 4745, as *P. corallina*. *Camb. Brit. Fl.* iii. *Plate 166.* Hort., origin Steep Holm, Somerset (G. C. D.).

Exsiccata :—Huet et Pavillon (*Pl. Sic.*), as *P. corallina.*

Perennial. *Root* thick, with sessile large conical tubers. *Shoot* glabrous or nearly so, up to about a metre high. *Ground leaves* with long petioles ; laminae ternate, upper ones pinnate, rather glaucous beneath ; pinnae oval or elliptical, entire. *Inflorescence* solitary. *Flowers* about 8—10 cm. in diameter ; late May. *Sepals* about 5 or 6, 1 or 2 resembling reduced leaflets. *Petals* crimson, 5—10. *Stamens* ∞ , filaments crimson, anthers yellow. *Carpels* 1—5, densely tomentose, stigmas recurved. *Follicles* large, tomentose, strongly divergent ; pericarp thick, about 4—5 cm. long and 1·6—1·8 broad.

[1] "Herbae perennes vel frutices, caulibus ramosis. Folia alterna, ampla, pinnatim-dissecta vel decomposita, subcarnosa, exstipulata. Bracteae in sepala abeuntiae. Sepala seriatim inserta, herbacea, 1—2 extima bracteoïdea. Petala 5—10, ampla, conspicua, 1—2 spiraliter inserta. Stamina ∞ , ∞ -seriatim inserta. Carpella 2—5, multiovulata, carnosa, folliculatim dehiscentia. Semina magna, saepe rubra ; albumen carnosum, oleaginosum." W. C. Worsdell, *in litt.*

The *P. simplex latiore folio trifido* of Morison is cited by Retzius when founding his *P. corallina*. There is a leaf of the plant in Morison's herbarium; and this is identified by Dr O. Stapf (see Vines and Druce *Morison Herb.* 162 (1914)) as being probably *P. corallina* Retz., i.e., *P. mascula* Miller.

The Steep Holm paeony (*P. mascula*) was not known to the older British botanists, such as Ray, Hudson, and Withering. It was first made known to the botanical public in 1805, when Smith published the figure in the *English Botany* (t. 1513). The plant had been found two years earlier; and the discoverer stated (see Smith *loc. cit.*) that he came across two fishermen who could recollect having gathered its flowers 60 or 70 years before that. Smith treated the plant as a native. Syme (*loc. cit.* (1863)) regarded the plant as only naturalised.

The Rev. E. S. Marshall visited the Steep Holm, in June, 1914, and informs us (*in litt.*) that the paeony "grows only in two patches, at the very edge of an overhanging precipice, 50—70 feet [ca. 15—20 m.] in height, and at the foot of a long, very steep uncultivable rock-slope." Mr Marshall regards the plant as indigenous on the Steep Holm. Mr G. C. Druce, on the other hand, after a visit to the locality, is of opinion that the paeony was originally introduced. It grows near other introduced plants.

The common garden paeony (*P. officinalis* L. emend. = *P. femina* Miller) is closely allied to the present species, and occurs occasionally in waste places as a garden-outcast, as far northwards at least as Forfarshire. *P. mascula* is also cultivated in English gardens, but much less commonly than *P. officinalis*.

Naturalised on cliffs of Carboniferous Limestone on the Steep Holm, Somerset, in the Bristol Channel; introduced or adventitious elsewhere.

Central France (Loir et Cher, Loiret, Vienne, Côte-d'-Or), south-central Europe, southern Europe; Asia Minor to Persia.

## Order 2. PAPAVERALES

**Papaverales** nobis; *Rhoeadeae* Bartling *Ordines Nat. Pl.* 254 (1830); *Rhoeades* Endlicher *Gen. Pl.* 854 (1839); *Rhoeadales* Engler *Syll.* 111 (1892); Carter *Gen. Brit. Pl.* 49 (1913).

For characters, see page 93.

Usually herbaceous perennials or annuals. *Stipules* usually absent. *Inflorescence* racemose or solitary. *Flowers* usually cyclic (androecium rarely spiral), usually heterochlamydeous, hypogynous, actinomorphic or zygomorphic. *Sepals* usually 4, usually more or less caducous or small. *Petals* usually 4. *Stamens* ∞—2. *Carpels* ∞—2. *Ovules* with 2 integuments.

### Suborders of *Papaverales*

Suborder 1. **Papaverineae** (see below). *Sepals* usually 2.

Suborder 2. **Capparidineae** (see Volume IV). *Sepals* 4 or more.

### Suborder I. *PAPAVERINEAE*

**Papaverineae** nobis; *Rhoeadineae* Engler *Pflanzenfam.* Nachtr. 348 (1897); Carter *Gen. Brit. Pl.* 49 (1913).

For character, see above.

### British families of *Papaverineae*

Family 1. **Papaveraceae** (see below). *Latex* present. *Flowers* actinomorphic. *Petals* without spur. *Stamens* ∞.

Family 2. **Fumariaceae** (p. 168). *Latex* absent. *Flowers* usually transversely zygomorphic. *Outer petals*—1 or both with a more or less developed spur. *Stamens* 2, each 3-branched.

### Family 1. PAPAVERACEAE

**Papaveraceae** Jussieu *Gen. Pl.* 235 (1789) emend.; DC. *Syst. Nat.* ii, 67 (1818); Lindley *Syn.* 16 (1829); Bernhardi in *Linnaea* viii, 459 (1833); Rouy et Foucaud *Fl. France* i, 152 (1893); Robinson and Fernald in Gray's *New Man.* ed. 7, 414 (1908); *Papaveroïdeae* Al. Br. in Ascherson *Fl. Brandenb.* i, 48 (1864); Prantl und Kündig in Engler und Prantl *Pflanzenfam.* iii, pt. ii, 130 (1891); Fedde in *Pflanzenr.* iv, pt. 104, 97 (1909).

Herbs or undershrubs, rarely shrubs or trees, with latex. *Leaves* exstipulate, alternate. *Flowers* without nectar. *Sepals* 2, caducous. *Petals* 4, in 2 whorls, crumpled in bud. *Stamens* ∞, free, hypogynous. *Ovary* with 2—18 carpels, syncarpous, superior (rarely subinferior, as in the exotic *Eschscholtzia*). *Ovules* ∞, anatropous or slightly campylotropous. *Placentae* parietal, projecting. *Style* short or absent. *Stigmas* as many as the placentae. *Fruit* either a septicidal capsule or opening by pores near the top. *Endosperm* oily. *Embryo* small, near the base of the endosperm.

The family *Papaveraceae* is closely related to *Fumariaceae* through *Hypecoum*, and to the exotic family *Capparidaceae* and to the *Brassicaceae* (or *Cruciferae*). A transition to the *Brassicaceae* is to be observed in the fruits of *Chelidonium*, which are unilocular, through those of *Glaucium*, which are bilocular almost to the base. The genus *Papaver* is highly

specialised and is therefore placed last in the sequence of the genera of the family: it is connected with *Chelidonium* through *Meconopsis*.

26 genera; chiefly in the north temperate zone.

BRITISH TRIBES OF *Papaveraceae*

Tribe I. **Chelidoniëae** (see below). *Latex* yellowish to reddish. *Stigmas* 2 (rarely 3—4). *Seeds* arillate.

Tribe II. **Papavereae** (p. 158). *Latex* yellowish to white. *Stigmas* 4—16. *Seeds* usually not arillate.

## Tribe I. **CHELIDONIËAE*

**Chelidoniëae** Reichenbach *Handb.* 264 (1837) partim; Fedde *op. cit.* 98 et 203 (1909).

For characters, see above. Only British genus:—**Chelidonium.*

## Genus 1. *Chelidonium

**Chelidonium** [Tournefort *Inst.* 231, t. 116 (1700);] L. *Sp. Pl.* 505 (1753) et *Gen. Pl.* ed. 5, 224 (1754) pro min. parte; Prantl und Kündig *Pflanzenfam.* iii, pt. 2, 139 et 140 (1891); Fedde in *Pflanzenr.* iv, pt. 104, 212 (1909).

Perennial herb, with orange-coloured sap. *Leaves* petioled; laminae pinnate. *Inflorescence* cymose, umbellate or nearly so. *Flowers* dimerous. *Ovary* unilocular, of 2 carpels. *Style* distinct. *Stigmas* 2, sessile, oblique. *Fruit* a capsule, elongate, simulating a siliqua, carpels dehiscing from below upwards. *Seeds* ∞, arillate, with a shining and punctate testa.

Linnaeus (*loc. cit.*) recognised four species of his genus *Chelidonium* of which only one (*C. majus*) now remains: the others are distributed in the genera *Glaucium* and *Roemeria*. If we here strictly followed Art. 45 of the international rules of botanical nomenclature, it would be necessary to apply the name *Chelidonium* to *Glaucium* and the name *Glaucium* to *Chelidonium*. As we have before stated, we do not in the *Camb. Brit. Fl.* change any established generic names on grounds of this character. We adopt the position that all generic names which are firmly established in post-Linnaean botanical literature must, if found to be incorrect on mere pedagogical grounds, be regarded as *nomina conservanda*. In fact, we have elsewhere (see *Journ. Bot.* lii, 197 (1914)) urged our view that it is a pity the same attitude cannot be taken up with regard to specific names; but this course, at present, is unfortunately impracticable.

1 species:—**C. majus.*

### 1. *CHELIDONIUM MAJUS. Greater Celandine. Plate 167

*Hirundinaria* Turner *Names* (1548); *C. majus* Gerard *Herball* 911 (1597); *Papaver corniculatum luteum chelidonia dictum* Ray *Syn.* ed. 3, 309 (1724).

**Chelidonium majus** L. *Sp. Pl.* 505 (1753)!; Smith *Fl. Brit.* 563 (1800)!; Syme *Eng. Bot.* i, 99 (1863); Rouy et Foucaud *Fl. France* i, 166 (1893); Fedde *op. cit.* 212 (1909).

Icones:—Smith *Eng. Bot.* t. 1581; Woodward *Bot. Med.* Suppl. t. 263; *Fl. Dan.* t. 542; Reichenbach *Icon.* iii, t. 10, fig. 4466; Syme *Eng. Bot.* i, t. 67.

*Camb. Brit. Fl.* iii. *Plate 167.* (*a*) Lower leaf. (*b*) Flowering shoot. (*c*) Flowering and fruiting shoot. (*d*) Fertile shoot of subvar. *laciniatum*. (*e*) Petals of subvar. *laciniatum*. *a—c* from Huntingdonshire (E. W. H.); *d—e* from Herefordshire (S. H. B.).

Exsiccata:—Billot, 4; Todaro, 917; *Herb. Fl. Ingric.* vii, 35.

*Shoot* about 3—7 dm. high, brittle, with some soft hairs. *Petioles* of the lower leaves about 6 cm. long. *Laminae* pinnate; pinnae about 3—5 cm. long and 2 broad, toothed or lobed or laciniate, glabrous underneath. *Peduncle* hairy, long (3—8 cm.). *Bracts* involucral, at the base of the pedicels, small. *Pedicels* hairy, slender, about 2—3 cm. long. *Inflorescence* umbellate. *Flowers* about 1·5—2·5 cm. in diameter; May to October. *Sepals* yellowish. *Petals* yellow. *Capsule* glabrous, rather tortuous, about 3—10 together, each 3—4 cm. long.

(*β*) subvar. **laciniatum** comb. nov.; *C. majus* var. *β* L. *Sp. Pl.* 506 (1753); *C. laciniatum* Miller *Gard. Dict.* ed. 8, no. 2 (1768); *C. majus* var. *laciniatum* Grenier et Godron *Fl. France* i, 62 (1847); Syme *Eng. Bot.* i, 99 (1863); Rouy et Foucaud *Fl. France* i, 166 (1893). [*C. majus folio magis dissecto* Johnson in Gerard *Herball* ed. 2, 1069 (1633); *C. majus foliis quernis* Dillenius in Ray *Syn.* ed. 3, 309 (1724).]

Icones:—Reichenbach *Icon.* iii, t. 10, fig. 4467, as *C. laciniatum*.

*Camb. Brit. Fl.* iii. *Plate 167* (*d—e*).

Exsiccata:—Billot, 4 bis.

*Laminae* and *petals* laciniate.

This laciniate form was recorded by Dillenius (*loc. cit.*) for Surrey: it still occurs rarely as a garden-escape, as in Herefordshire.

*C. majus* is not uncommon in hedgerows, roadsides, and waste places, chiefly near cottage-gardens; northwards to Inverness-shire, and widespread in Ireland.

Europe (not indigenous in the north or west); northern Africa; Asia; North America (not indigenous).

## Tribe II. *PAPAVEREAE*

**Papavereae** Bernhardi in *Linnaea* viii, 459 (1833); Fedde *op. cit.* 99 et 221 (1909).

For characters, see page 157.

### Subtribes of *Papavereae*

Subtribe I. **Glauciinae** (see below). *Capsule* dehiscing along almost its entire length by valves.

Subtribe II. **Papaverinae** (p. 160). *Capsule* dehiscing by pores only near the apex.

## Subtribe 1. *GLAUCIINAE*

**Glauciinae** nobis. For character, see above.

### Genera of *Glauciinae*

Genus 2. ***Roemeria** (see below). *Petals* crumpled in bud. *Capsule* unilocular. *Stigmas* 2—4, usually 3.

Genus 3. **Glaucium** (p. 159). *Petals* convolute in bud. *Capsule* bilocular almost down to the base. *Stigmas* 2 or rarely 3. *Seeds* partly immersed in the spongy septum.

## Genus 2. *Roemeria

**Roemeria** Medicus in Usteri *Ann. Bot.* iii, 15 (1792); Prantl und Kündig in Engler und Prantl *Pflanzenfam.* iii, pt. 2, 141 (1889); Fedde *op. cit.* 238 (1909); *Chelidonium* L. *loc. cit.*, partim. [*Glaucium* Tournefort *loc. cit.*, partim.]

Annual herbs with yellow sap. *Leaves* petiolate; laminae bipinnatipartite or tripinnatipartite, segments narrow. *Inflorescence* solitary. *Petals* 4, crumpled in bud, violet or scarlet. *Stamens* ∞. *Ovules* unilocular. *Style* short. *Stigmas* 2—4, usually 3, deflexed, small. *Capsule* elongate, simulating a siliqua, unilocular, dehiscing from the base upwards. *Seeds* ∞, reniform, punctate, with no aril.

9 species; Mediterranean region to Afghanistan. Only British species:—**R. hybrida.*

### 1. *ROEMERIA HYBRIDA. Plate 168

*Papaver cornutum flore violaceo* Gerard *Herball* 294 (1597); *P. corniculatum violaceum* Ray *Cat. Cantab.* 111 (1660); *Syn.* ed. 3, 309 (1724).

**Roemeria hybrida** DC. *Syst. Nat.* ii, 92 (1821); Syme *Eng. Bot.* i, 95 (1863); Fedde *op. cit.* 239 (1909); *Chelidonium hybridum* L. *Sp. Pl.* 506 (1753); Smith *Eng. Bot.* no. 201 (1794); *Glaucium violaceum* Jussieu *Gen. Pl.* 236 (1789); Smith *Fl. Brit.* 565 (1800); *R. violacea* Medicus in Usteri *Ann. Bot.* iii, 15 (1792); Rouy et Foucaud *Fl. France* i, 165 (1893).

Icones:—Smith *Eng. Bot.* t. 201, as *Chelidonium hybridum*; Sibthorp et Smith *Fl. Graec.* v, t. 490, as *Glaucium violaceum.*

*Camb. Brit. Fl.* iii. *Plate 168.* (*a*) Lower leaf. (*b, c, d*) Flowering branches. (*e*) Sepals. (*f*) Fruit and pedicel. (*g*) Portion of fruit (enlarged). Hort., seed originally from a cornfield in Norfolk (E. M. H.).

Exsiccata:—Bourgeau (*Pl. d'Esp. 1851*); Huter, Porta, et Rigo (*Itin. Hisp. 1879*), 967; Orphanides (*Fl. Graec.*), 1092; *Fl. Alger.* 304.

Annual, with the habit of *Papaver hybridum. Shoots* rather hairy, up to about 5 dm. high. *Petioles* of the lower leaves about as long as (7—8 cm.) the laminae. *Laminae* compound; pinnae pinnatifid, lobes flat, broadly linear, rather acute. *Flower-buds* nodding. *Flowers* up to about 6 cm. in diameter. *Pedicels* hairy, at least when young. *Sepals* hairy. *Petals* violet, with a darker spot at the base, broadly obovate. *Capsule* linear, glabrous or with a few hairs, up to about 7—8 cm. long at maturity.

Adventitious; formerly a cornfield weed on the chalk, about Swaffham Prior in Cambridgeshire, but not found there since 1835; a single former sporadic record in Norfolk.

France (central and southern), southern Europe; northern Africa; Asia Minor to Beluchistan.

## Genus 3. Glaucium

**Glaucium** [Tournefort *Inst.* 254, t. 130 (1700) partim; Miller *Abr. Gard. Dict.* ed. 4 (1754) partim;] Crantz *Stirp. Austr.* ii, 133 (1763); Jussieu *Gen. Pl.* 236 (1789); Medicus in Usteri *Ann. Bot.* iii, 14 (1792); Prantl und Kündig in *Pflanzenfam.* iii, pt. 2, 141 (1889); Fedde *op. cit.* 221 (1909).

Annual or biennial herbs with yellow sap. *Ground leaves* petiolate; petioles often vaginate below; laminae usually pinnatifid, segments sinuate to dentate. *Inflorescence* solitary, axillary or terminal. *Petals* brown, yellow, scarlet, or bluish, convolute in bud. *Stamens* ∞. *Ovary* bilocular or rarely trilocular. *Ovules* ∞. *Stigmas* 2 or rarely 3, sessile or subsessile, deflexed, wider than the capsule. *Capsule* greatly elongate, simulating a siliqua, bilocular almost to the base, dehiscing from below upwards. *Seeds* ∞, ovate-reniform, punctate, with no aril, partly immersed in the aërenchymatous septum.

21 species; Europe and Asia, especially Mediterranean.

British species of *Glaucium*

1. ***G. corniculatum** (see below). *Stem* hairy. *Petals* scarlet. *Stigmas* stouter. *Capsule* hairy.

2. **G. flavum** (see below). *Stem* glaucous and glabrous (or with hairs minute). *Petals* yellow. *Stigmas* more slender. *Capsule* glabrous.

### 1. *GLAUCIUM CORNICULATUM. Scarlet Horned Poppy. Plate 169

*Papaver cornutum flore rubro* Gerard *Herball* 294 (1597).

**Glaucium corniculatum** Curtis *Fl. Lond.* ii, no. 101 (n. d.); Syme *Eng. Bot.* i, 96 (1863); Rouy et Foucaud *Fl. France* i, 164 (1893); Fedde *op. cit.* 223 (1909); *Chelidonium corniculatum* L. *Sp. Pl.* 506 (1753)!; *Glaucium phoenicium* Crantz *Stirp. Austr.* ii, 133 (1763); Smith *Fl. Brit.* 564 (1800); *Chelidonium glabrum* Miller *Gard. Dict.* ed. 8, no. 5 (1768).

The British plant belongs to the following variety:—

(*a*) **G. corniculatum** var. **phoenicium** DC. *Syst. Nat.* ii, 96 (1821); Rouy *Fl. France* i, 164 (1893); Fedde *op. cit.* 223 (1909).

Icones:—Smith *Eng. Bot.* t. 1433, as *G. phoenicium*; Curtis *Fl. Lond.* ii, t. 101, as *G. corniculatum*; Sibthorp and Smith *Fl. Graec.* v, t. 489, as *G. phoenicium*, Reichenbach *Icon.* iii, t. 12, fig. 4471, as *G. corniculatum.*

*Camb. Brit. Fl.* iii. *Plate 169.* (*a*) Lower leaf. (*b*) Flowering branch. (*c*) Flower-bud. (*d*) Flower. (*e*) Petal. (*f*) Fruit. (*g*) Portion of fruit, with a carpel removed. Hort., from seed from Jersey (E. W. H.).

Exsiccata:—Bourgeau (*Pl. d'Esp.*), 534; (*Pl. Canar.*), 613.

Annual. *Shoot* about 6 dm. high, hairy. *Petioles* of the lower leaves about a third as long as the *laminae*. *Laminae* pinnatifid, those of the stem-leaves hemi-amplexicaul; lobes coarsely toothed. *Flowers* up to 5 cm. in diameter; June and July. *Sepals* 2, softly hairy. *Petals* scarlet with a dark patch at the base. *Stamens* about 15. *Ovary* hairy; stigma with conspicuous lobes. *Fruit* hairy, about 16—20 cm. long. *Seeds* blackish, reticulate; August.

Sandy places near the sea, usually adventitious; e.g., Jersey, Dorset, Somerset, Norfolk.

Europe (central and southern); northern Africa; Asia Minor to Persia

### 2. GLAUCIUM FLAVUM. Yellow Horned Poppy. Plate 170

*Papaver corniculatum* Turner *Names* (1548); *P. cornutum flore luteo* Gerard *Herball* 294 (1597); *P. corniculatum luteum* Ray *Syn.* ed. 3, 309 (1724).

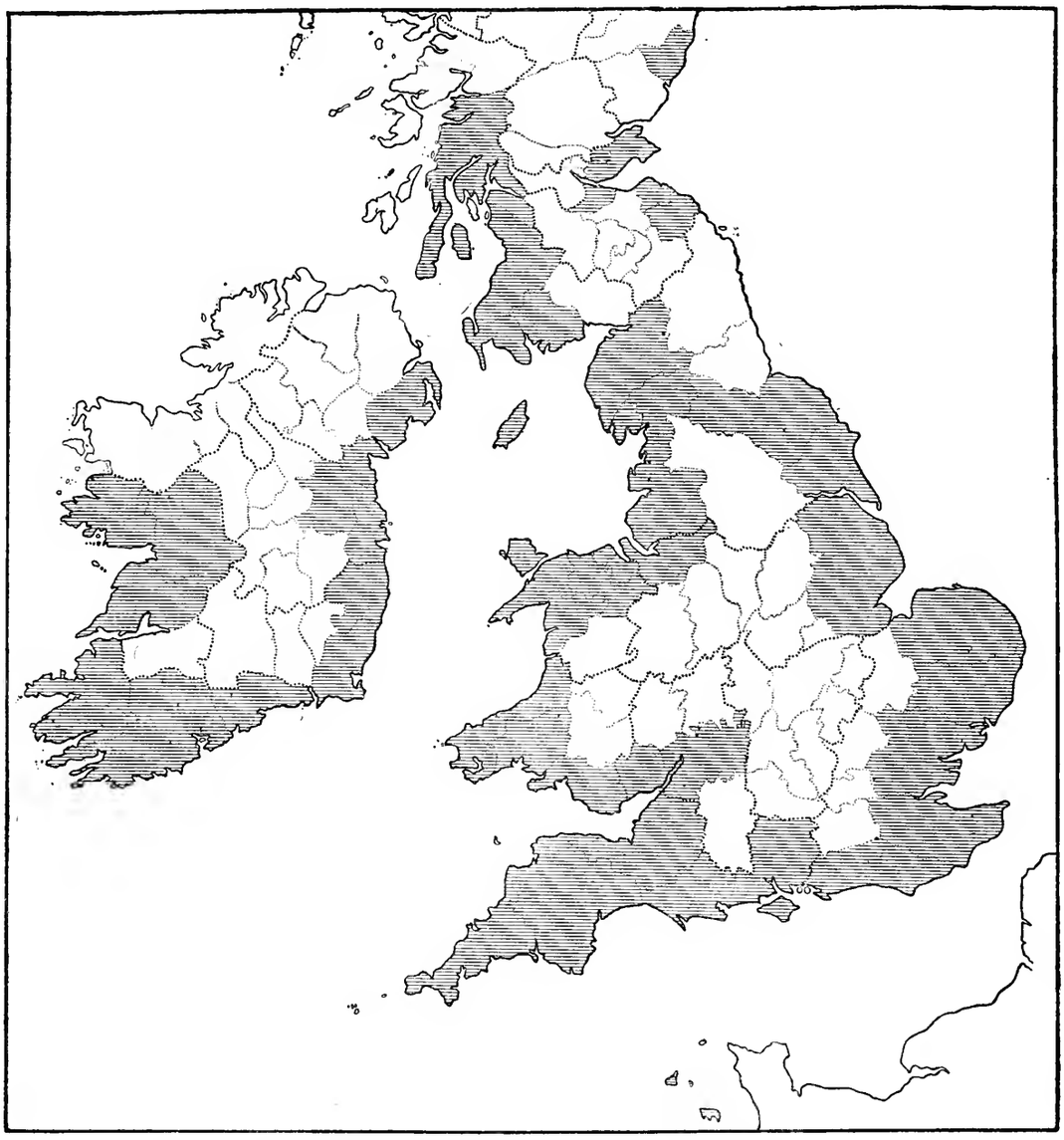
**Glaucium flavum** Crantz *Stirp. Austr.* fasc. ii, 133 (1763); Rouy et Foucaud *Fl. France* i, 163 (1893); Fedde *op. cit.* 232 (1909); *Chelidonium glaucium* L. *Sp. Pl.* 506 (1753)!; Smith *Eng. Bot.* no. 8 (1791); *G. luteum* Scopoli *Fl. Carn.* i, 369 (1772); Smith *Fl. Brit.* 563 (1800); Syme *Eng. Bot.* i, 97 (1863); *G. glaucium* Karsten *Deutsche Fl.* 649 (1883).

Icones:—Smith *Eng. Bot.* t. 8, as *Chelidonium glaucium*; *Fl. Dan.* t. 585, as *Chelidonium glaucium*; Reichenbach *Icon.* iii, t. 11, fig. 4468, as *Glaucium luteum.*

*Camb. Brit. Fl.* iii. *Plate 170.* (*a*) Ground-leaf. (*b*) Lower stem-leaf. (*c*) Flowering shoot. (*d*) Fruit. Isle of Wight (E. W. H.).

Exsiccata:—Billot, 2806, as *G. luteum*; Bourgeau (*Pl. Esp.*), 334; Fries, x, 29, as *G. luteum*; Todaro, 1320, as *G. luteum.*

Perennial. *Root* strong and deep. *Stem* ultimately decumbent, branched, pale green, up to nearly 1 m. long. *Petioles* of the ground leaves short, upper leaves sessile. *Laminae* of the ground leaves pinnatipartite, lobes more or less irregularly toothed, often hairy; upper ones sessile, coarsely toothed, often somewhat hairy on the inside. *Inflorescence* solitary. *Pedicel* up to about 5 cm. long. *Buds* shortly acuminate. *Flowers* up to 8—9 cm. in diameter; late May to August. *Sepals* somewhat bristly, slightly twisted in bud. *Petals* deep yellow. *Stigmas* persistent. *Capsule* more or less arched,



Map 62. *Glaucium flavum* occurs on the coasts of the counties which are shaded

grooved on each side, very long, up to 30 cm.—"much longer than could be expressed in our figure" (Smith *Eng. Bot.* t. 8); carpels dehiscing from the top downwards.

Sandy and shingly foreshores; northwards to Argyllshire and Kincardineshire; Ireland—west coast (local), and from county Cork to county Down.

Southern Scandinavia, Denmark, Germany, Belgium, France, central and southern Europe, southern Russia; northern Africa; south-western Asia; North America (not indigenous).

## Subtribe 2. *PAPAVERINAE*

**Papaverinae** nobis. For character, see page 158.

### British genera of *Papaverinae*

Genus 4. **Meconopsis** (p. 161). *Stigmatic disc* absent. *Style* distinct. *Carpels* 4—5. *Capsules* dehiscing only by large pores near the apex caused by the folding back of the carpels.

Genus 5. **Papaver** (p. 161). *Stigmatic disc* present. *Style* absent. *Carpels* 4—∞. *Capsule* dehiscing by pores situate just beneath the stigmatic disc.

## Genus 4. Meconopsis

**Meconopsis** Viguier *Hist. Pav.* 48, fig. 3 (1814); DC. *Fl. France* suppl. 586 (1815); Prantl und Kündig *op. cit.* 141 (1889); Fedde *op. cit.* 247 (1909); *Papaver* L. *loc. cit.*, partim.

Perennial or annual herbs, differing from *Papaver* in the following characters:—*Sap* yellow. *Style* distinct, short. *Stigmas* 4—6. *Stigmatic disc* absent. *Capsule* with imperfect partitions, dehiscing by the folding back of the carpels at the top.

This genus is interesting as exhibiting the transition of the fruit from the *Chelidoniëae* to the more specialised *Papaver*, and thus indicates the relationship between *Papaver* and the *Brassicaceae* (or *Cruciferae*).

28 species; western Europe; Asia; North America.

### 1. MECONOPSIS CAMBRICA. Welsh Poppy. Plate 171

*Argemone lutea cambro-britanica* Parkinson *Theatr. Bot.* 369 (1640); Ray *Syn.* ed. 3, 309 (1724); *P. cambricum perenne flore sulphureo* Dillenius *Hort. Eltham.* ii, 300, t. 223 (1732).

**Meconopsis cambrica** Viguier *Hist. Pav.* 48, fig. 3 (1814); Syme *Eng. Bot.* i, 94 (1863); Rouy et Foucaud *Fl. France* i, 163 (1893); Fedde *op. cit.* 251 (1909); *Papaver cambricum* L. *Sp. Pl.* 508 (1753)!; Smith *Eng. Bot.* no. 66 (1792); *Fl. Brit.* 568 (1800).

Icones:—Dillenius *Hort. Eltham.* ii, t. 223, as *P. cambricum perenne flore sulphureo*; Smith *Eng. Bot.* t. 66, as *P. cambricum*; Baxter *Brit. Phaen. Bot.* i, t. 54.

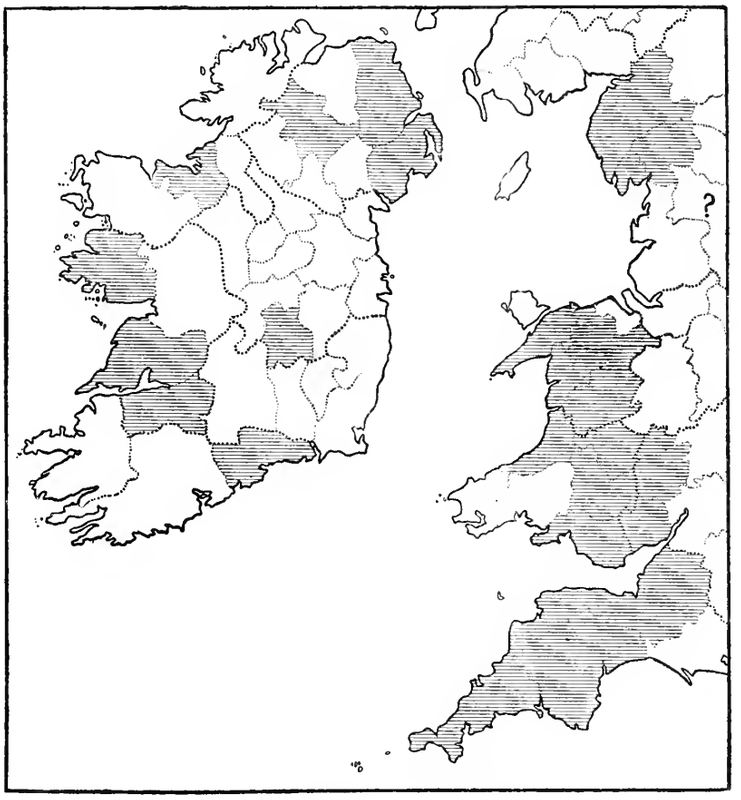
*Camb. Brit. Fl.* iii. *Plate 171.* (*a*) Lower leaf. (*b*) Flowering shoot. (*c*) Flower. (*d*) Young fruit. (*e*) Fruit. Somerset (W. F. M.).

Exsiccata:—Billot, 504; Bourgeau (*Pyr. Esp.*), 338.

Perennial, with a creeping rhizome. *Shoot* about 3—6 dm. high, almost glabrous except for hairs at the base of the stem, the base of the petioles, and the sepals. *Leaves* petioled; laminae pinnate; pinnae pinnatifid below; lobes coarsely and irregularly toothed, cuneate at the base. *Flowers* up to 7·5 cm. in diameter; May to August. *Sepals* rather hairy. *Petals* pale orange. *Stamens* ∞. *Capsule* glabrous, elliptical-claviform, dark brown, with 4—6 conspicuous ridges.

Local; in moist gravelly or rocky copses and woods; often on calcareous soil; western England, Wales, south-western Scotland, Ireland (local). Although often planted, it seems to be really indigenous in the above area, out of which it is planted or a garden-escape.

France, ? Switzerland (Jura), Spain.



Map 63. Distribution of *M. cambrica* in the British Islands

## Genus 5. Papaver

**Papaver** [Tournefort *Inst.* 237, t. 119 et t. 120 (1700) partim;] L. *Sp. Pl.* 506 (1753) et *Gen. Pl.* ed. 5, 224 (1754) emend.; Viguier *Hist. Pav.* 35 (1814); Prantl und Kündig in Engler und Prantl *Pflanzenfam.* iii, pt. 2, 141 (1889); Fedde *op. cit.* 288 (1909).

Herbs, with white or yellowish latex. *Leaves* lobed or dissected. *Pedicels* long, recurved in bud, erect in flower and fruit. *Flowers* usually without nectar. *Stigmas* 4—20, rayed, sessile, placed on a more or less convex disc. *Capsule* opening by pores just below the stigmatic disc, subglobular

to subclaviform, unilocular, with parietal placentae which project inwards and thus form more or less imperfect partitions. *Seeds* ∞, punctate, reniform, without an aril.

About 40 species; cosmopolitan.

### British sections of *Papaver*

Section I. **Eu-Papaver** (see below). *Stem* solid. *Shoot* scarcely glaucous. *Leaves* deeply cut, not amplexicaul. *Sepals* hairy.

Section II. *__Somniferum__ (p. 167). *Stem* hollow. *Shoot* strongly glaucous. *Leaves* toothed or lobed, amplexicaul. *Sepals* glabrous or with a few bristles.

## Section I. *EU-PAPAVER*

**Eu-Papaver** nobis; *Rhoeades* Bernhardi in *Linnaea* viii, 463 (1833); Prantl und Kündig in *Pflanzenfam.* iii, pt. 2, 142 (1889).

For characters, see above.

### British series of *Eu-Papaver*

Series i. **Dubia** (see below). *Inner petals* markedly smaller than the outer ones. *Filaments* not dilated above. *Capsule* glabrous.

Series ii. **Hybrida** (p. 165). *Inner petals* nearly the same as the outer ones. *Filaments* not dilated above. *Capsule* more or less hispid.

### Series i. *DUBIA*

**Dubia** nobis; *Ortho-Rhoeades* Fedde *op. cit.* 289 et 338 (1909).

For characters, see above.

### British species and hybrid of *Dubia*

1. **P. dubium** (see below). *Laminae* with narrower lobes. *Stigmas* 4—12. *Pedicel* with spreading hairs. *Capsules* much longer than broad.

***P. dubium* × *rhoeas*** (p. 163). Plants with a mixture of, or a blend of the characters of, the putative parents.

2. **P. rhoeas** (p. 164). *Laminae* with broader lobes. *Pedicel* with appressed hairs. *Stigmas* 7—12. *Capsule* about as long as broad.

## 1. PAPAVER DUBIUM. Poppy. Plate 172

*Argemone capitulo longiore glabro* Ray *Hist.* i, 856 (1686); *P. laciniato folio capitulo longiore glabro seu argemone capitulo longiore glabro* Ray *Syn.* ed. 3, 309 (1724).

**Papaver dubium** L. *Sp. Pl.* 1196 (1753)!; *Fl. Suec.* ed. 2, 182 (1753); Smith *Eng. Bot.* no. 644 (1799); *Fl. Brit.* 567 (1800); Syme *Eng. Bot.* i, 88 (1863); Rouy et Foucaud *Fl. France* i, 157 (1893); Fedde *op. cit.* 313 (1909).

Icones:—*Camb. Brit. Fl.* iii. *Plate 172.* (*a*) Lower leaf of var. *lecoqi.* (*b*) Flower of var. *lecoqi.* (*c*) Fruits of var. *lecoqi.* (*d*) Top of capsule of var. *lecoqi.* Cambridgeshire (C. E. M.). (*e*) Lower leaf of var. *collinum.* (*f*) Fertile shoot of var. *collinum.* (*g*) Top of capsule of var. *collinum.* Jersey (E. W. H.).

Exsiccata:—Bourgeau (*Pl. Canar.*), as *P. hybridum.*

Annual. *Shoot* more or less hairy. *Leaves* sessile, pinnatipartite, lobes entire or dentate, somewhat glaucous. *Pedicels* with appressed hairs. *Flowers* smaller than in *P. rhoeas*, about 5·0 or 5·5 cm. in diameter; May to July. *Petals* scarlet, suborbicular. *Filaments* not inflated, violet. *Stigmas* 4—12, reaching or nearly reaching the outside edge of the disc. *Capsule* claviform or subclaviform, more or less attenuate below, about 2·0—2·5 cm. long and 7—8 mm. broad. *Disc* convex.

"Linnaeus, by the name *dubium*, seemed to suspect it might not be distinct from the common poppy, t. 645 [= *P. rhoeas*]; but we believe no species can be better defined" (Sir J. E. Smith *Eng. Bot.* no. 644 (1799)). Our own opinion is that *P. dubium* is very closely allied to *P. rhoeas*, and that the two species hybridise freely in nature producing several intermediates (see *P. dubium* × *rhoeas*) which appear in books as varieties of the one species or the other.

(*a*) P. dubium var. lecoqi Fedde *op. cit.* 317 (1909); *P. lecoqi* Lamotte *Note Pap. dub.* 5, in *Ann. Sc. Lit. Auvergne* (1851) excl. syn. Reichenbach; Babington *Fl. Camb.* 300 (1863)!; *P. dubium* subsp. *lecoqi* Syme *Eng. Bot.* i, 90 (1863); *P. dubium* race *lecoqi* Rouy et Foucaud *Fl. France* i, 158 (1893).

Icones :—Syme *Eng. Bot.* i, t. 60, as *P.* [*dubium* subsp.] *lecoqi*; Jordan *Icon. Eur.* i, t. 7, as *P. lecoqi*; t. 70, as *P. improperum.*

*Camb. Brit. Fl.* iii. *Plate 172, a—d.*

Exsiccata :—Wirtgen, viii, 318, as *P. lecoqi.*

*Sap* rapidly turning dark yellow on exposure to air. *Laminae* with acute lobes. *Petals* less unequal in size than those of var. *laevigatum* and more attenuate at the base. *Capsule* more nearly cylindrical, relatively broader and shorter; stigmas 6—8; stigmatic disc not spreading beyond the sides of the capsule. *Seeds* brown.

Local; southeastern and eastern England chiefly; Wales (Brecknockshire); Scotland (Roxburghshire, Dumfriesshire, ? Fifeshire, Perthshire, and Ross-shire); Ireland (co. Dublin).

Germany, Belgium, France, Switzerland, Serbia, Greece.

(*b*) **P. dubium** var. **laevigatum** Lecoq et Lamotte *Cat. Rais. Pl. Vasc.* 58 (1847); *P. laevigatum* Reichenbach *Icon.* iii, 3 (1838) non Bieberstein; *P. dubium* Smith *loc. cit.*; Curtis *loc. cit.*; sens. str.; *P. lamottii* Boreau *Fl. Centr. France* éd. 3, ii. 30 (1857); Babington *Fl. Camb.* 301 (1860); *P. dubium* subsp. *lamottii* Syme *Eng. Bot.* i, 89 (1863); *P. dubium* race *lamottii* Rouy et Foucaud *Fl. France* i, 157 (1893); *P. dubium* var. *subpinnatifidum* Fedde *op. cit.* 316 (1909).

Icones :—Smith *Eng. Bot.* t. 644, as *P. dubium*; Curtis *Fl. Lond.* ii, 104, as *P. dubium*; *Fl. Dan.* t. 902, as *P. dubium*; Reichenbach *Icon.* iii, t. 16, fig. 4478 b, as *P. laevigatum*; Jordan *Icon.* t. 8, as *P. vagum*; t. 66, as *P. mixtum*; t. 67, as *P. depressum.*

Exsiccata :—Huter, Porta, et Rigo (*Iter Hisp.*, 1879), 864, as *P. dubium*; Todaro, 865, as *P. dubium*; Wirtgen, x, 550, as *P. dubium.*

*Sap* remaining white on exposure to air. *Shoot* not conspicuously hairy. *Laminae* pinnatifid; segments narrow, lobed; lobes rather obtuse. *Petals*—two outer ones much larger than the two inner ones, truncate at the base. *Capsule* more obconical than in var. *lecoqi*, relatively longer and narrower; stigmas scarcely reaching the edge of the disc; stigmatic disc spreading beyond the sides of the capsule. *Seeds* grey.

This is the common form of the species in the British Islands and in Europe generally.

(*c*) **P. dubium** var. **collinum** Fedde in Engler's *Pflanzenr.* 315 (1909); *P. collinum* Boreau *Fl. Centr. Fr.* éd. 3, ii, 29 (1857); *P. dubium* race *collinum* Rouy et Foucaud *Fl. France* i, 158 (1893).

Icones :—*Svensk Bot.* t. 457, as *P. dubium*; Jacquin *Fl. Austr.* i, t. 25, as *P. dubium*; Reichenbach *Icon.* iii, t. 15, fig. 4477, as *P. dubium*; Jordan *Icon. Eur.* i, t. 9, as *P. luteo-rubrum*; t. 68, as *P. collinum*; t. 69, as *P. erroneum.*

*Camb. Brit. Fl.* iii. *Plate 172, e—g.*

Exsiccata :—Billot, 2609, as *P. collinum.*

*Shoot* much more hairy than in var. *laevigatum* and var. *lecoqi*: on the whole, more closely allied to the former than to the latter. *Sap* remaining white on exposure to air. *Leaves* erect, with oblong and obtuse lobes. *Petals* as in var. *laevigatum.* *Capsule* obconical, attenuate from the middle to the base; stigmas 5—8, scarcely reaching the edge of the disc; stigmatic disc spreading a little or not at all beyond the edge of the sides of the capsule. *Seeds* brownish.

Rare or overlooked. Jersey (E. W. H.), Berkshire (*Journ. Bot.* xliii, 16 (1905)), and perhaps elsewhere.

Germany, France, Switzerland, Greece.

A weed in cornfields and waste places, almost throughout the British Islands (northwards to Sutherlandshire), but rare in hilly districts.

Scandinavia, Denmark, Germany, Holland, Belgium, France, central Europe, Russia, southern Europe; North America (not indigenous).

***Papaver dubium* × *rhoeas*** nobis.

We are not aware that any experiments have been made in hybridising our wild poppies; but, from our field-observations in eastern England, we believe that hybrids between *P. dubium* and *P. rhoeas* are very common. In a recent number of the *Bot. Exch. Club Brit. Is. Report for 1912*, p. 228, some doubt is thrown on the matter, since some of the suggested hybrids produce good seed. Errors regarding hybrids die a very lingering death; but we should have thought that the numerous experiments on hybridism in plants would have long ago settled the points that hybrids even of quite distinct species are sometimes fertile, and that hybrids of varieties are usually so. It is time that these conclusions, which are based on extremely careful experiments dating back to the middle of the nineteenth century, were recognised by field-botanists.

There is an interesting article on "Poppy Hybrids" in *Journ. Bot.* li, 48 (1913), by the Rev. E. A. Woodruffe-Peacock.

We have observed the following putative hybrids in East Anglia. In addition, many plants occur which are not referable to any one of the hybrid-forms, but which combine the characters of *P. dubium* and *P. rhoeas* in varying degrees.

(A) × **P. intermedium** nobis; *P. intermedium* Becker *Fl. Frankf.* i, 386 (1828); *P. rhoeas* race *intermedium* Rouy et Foucaud *Fl. France* i, 154 (1893).

Icones :—Reichenbach *Icon.* iii, t. 16, fig. 4478, as *P. intermedium*; Jordan *Icon. Eur.* i, t. 10.

*Laminae* pinnatipartite; lobes rather narrow, toothed, teeth more or less acute, terminal lobe larger than the lateral ones. *Pedicels* with the hairs more or less patent. *Flower-buds* obtuse. *Flowers* intermediate in size between those of *P. dubium* and *P. rhoeas*. *Petals* usually without the basal dark spot. *Capsules* very variable, often even on a single plant, from as broad as long to 1·5 times as long as broad, usually somewhat attenuate at the base.

Cambridgeshire (not uncommon) and doubtless elsewhere, growing among either or both of the putative parents.

Europe.

(B) × **P. strigosum** nobis; *P. rhoeas* var. *strigosum* Boenninghausen *Prodr. Fl. Monast.* 157 (1824); Syme *Eng. Bot.* i, 87 (1863); *P. rusticum* Jordan *Diagn.* 99 (1864); *P. strigosum* Schur *Phytogr. Mitteil.* in *Verh. Naturf. Ver. Brünn.* xv, 5, 66 (1877) ex Fedde *op. cit.* 308 (1909); *P. rhoeas* race *strigosum* Rouy et Foucaud *Fl. France* i, 155 (1893).

Exsiccata :—Billot, 3006, as *P. strigosum*; Wirtgen, ix, 438.

*Laminae* with the lateral lobes spreading almost at right angles; the terminal one large, more or less largely dentate and irregularly lobed. *Stem* with spreading hairs. *Pedicel* with appressed hairs. *Capsule* oboval, gradually attenuate to the base.

Mr H. N. Dixon (see *Journ. Bot.* xxx, 309 (1892)) sowed seeds of this form; and out of 10 plants only 2 had appressed hairs to the pedicel. As the original plant was not necessarily self-pollinated, it cannot be definitely stated that factorial segregation is here proved; but the result suggests that phenomenon, since, if the plants raised from seed had been $F_1$ hybrids, they would probably have all been alike in the character observed.

Both Rouy and Foucaud (*loc. cit.*) and Ascherson and Graebner (*Fl. Nordost. Flachl.* 342 (1898)) suggest that this variety may be a hybrid of *P. dubium* and *P. rhoeas*.

Channel Islands, Dorset, Isle of Wight, Somerset, Sussex, Surrey, Essex, Norfolk, Buckinghamshire, Staffordshire, North Riding of Yorkshire, and doubtless elsewhere.

Europe.

(C) × **P. chelidonioïdes** nobis; *P. rhoeas* var. *chelidonioïdes* Kuntze *Taschenfl. Leipzig* 17 (1867); *P. dubium* × *lecoqi* Peacock in *Bot. Exch. Club Brit. Is., Report for 1913*, 307 (1914).

*Sap* yellow, as in *P. dubium* var. *lecoqi*, but often taking a little time to colour.

Lincolnshire (*Journ. Bot.* l, 348 (1912)).

Germany.

## 2. PAPAVER RHOEAS. Common Poppy. Plate 173

*P. erraticum* Turner *Names* (1548); *P. rhoeas* Gerard *Herball* 299 (1597); *P. laciniato folio capitulo breviore glabro annuum rhoeas dictum* Ray *Syn.* ed. 3, 308 (1724).

**Papaver rhoeas** L. *Sp. Pl.* 507 (1753)!; Smith *Eng. Bot.* no. 645 (1799); *Fl. Brit.* 567 (1800); Fedde *op. cit.* 293 (1909); *P. rhoeas* var. *vulgaris* Syme *Eng. Bot.* i, 87 (1863); *P. cereale* Jordan *Diagn.* 97 (1864); *P. rhoeas* race *rhoeas* Rouy et Foucaud *Fl. France* i, 154 (1893).

Icones :—Smith *Eng. Bot.* t. 645; *Fl. Dan.* t. 1580 (fruit intermediate between *P. dubium* and *P. rhoeas*; *Svensk Bot.* t. 519; Reichenbach *Icon.* t. xv, fig. 4470 (poor).

*Camb. Brit. Fl.* iii. *Plate 173.* (*a*) Upper part of plant. (*b*) Top of capsule, showing stigmatic disc. Norfolk (E. W. H.).

Exsiccata :—Billot, 211; 211 bis; Todaro, 866; Welwitsch (*Iter. Lusit.*), 256.

Annual. *Stem* erect, more or less hispid. *Leaves* sessile, pinnatifid or bipinnatifid; lobes coarsely and irregularly toothed, terminated by a short bristle; softly hairy. *Pedicels* with spreading hairs. *Flowers* about 6—10 cm. in diameter; May to August. *Sepals* hairy. *Petals* bright scarlet to crimson, often with a dark purple spot at the base, very broad. *Filaments* filiform, not broadening upwards. *Capsule* glabrous, about as long as broad, about 1·0—1·5 cm. in length. *Stigmas* 7—12, disc more or less convex, the overlapping lobes bending downwards.

(*β*) subvar. **erythrotrichum** comb. nov.; *P. rhoeas* var. *pryori*[1] Druce in *Bot. Exch. Club Brit. Is., Rep. for 1888*, i, 199 (1889); *P. rhoeas* var. *erythrotrichum* Fedde *op. cit.* 295 et 300 (1909).

*Hairs of the pedicel* red.

England, northwards to Cheshire at least. Germany.

[1] After Alfred Reginald Pryor (1839—1881).

Common as a weed of cornfields and waste places throughout the British Islands, but not obtrusively abundant in the north or in hilly districts as it is in East Anglia ("Poppyland").

Europe.

Series ii. *HYBRIDA*

**Hybrida** nobis; *Argemono-Rhoeades* Fedde *op. cit.* 290 et 326 (1909).

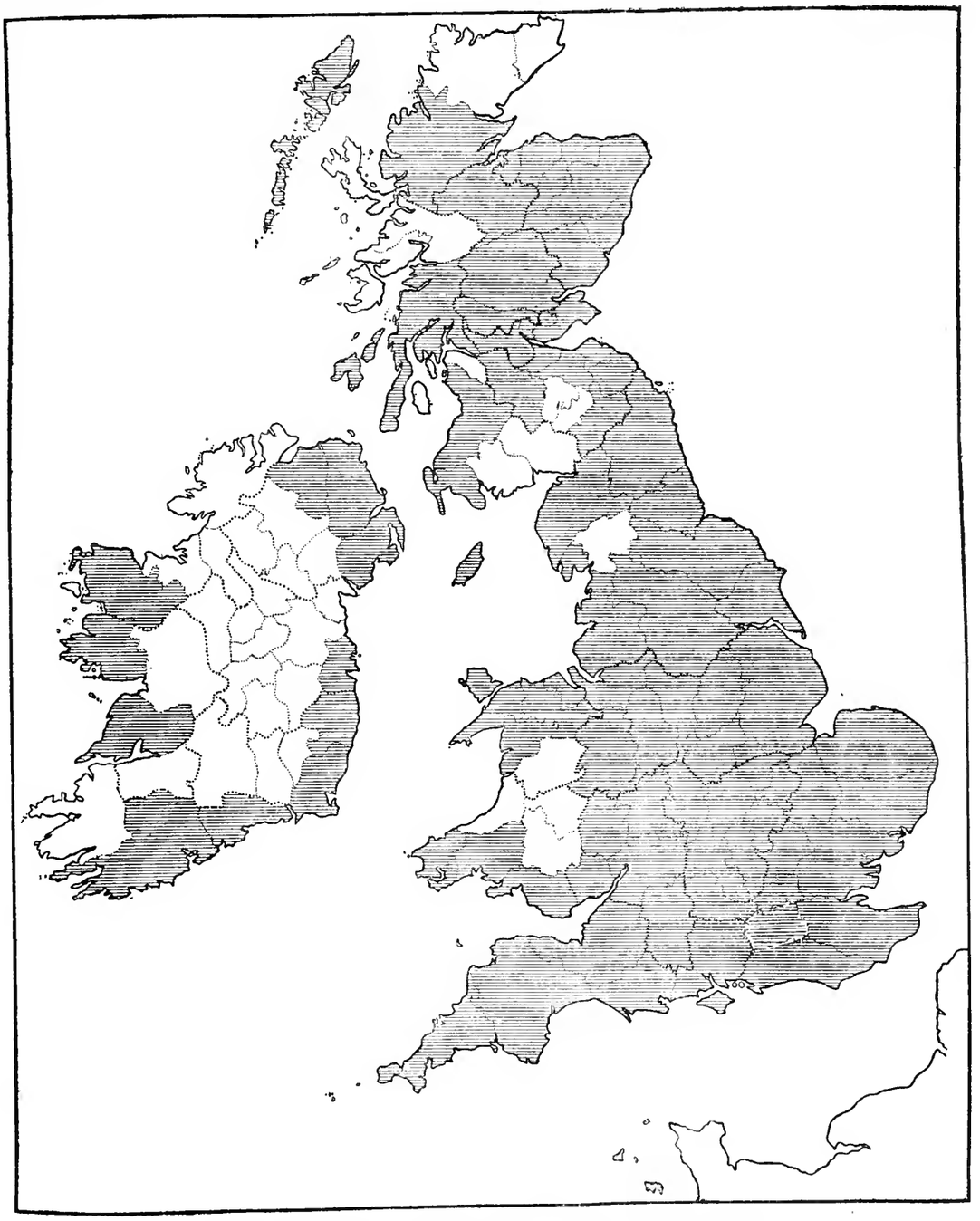
For characters, see page 162.

BRITISH SPECIES OF *Hybrida*

1. **P. argemone** (see below). *Petals* brick-red. *Stigmas* 4—5. *Capsule* longer than broad.
2. **P. hybridum** (p. 166). *Petals* dark crimson. *Stigmas* 4—6. *Capsule* about as long as broad.

## 3. PAPAVER ARGEMONE. Poppy. Plate 174

*Argemone capitulo longiore* Gerard *Herball* 300 (1597); *P. laciniato folio capitulo hispido longiore* Ray *Syn.* ed. 3, 308 (1724).



Map 64. Distribution of *Papaver argemone* in the British Islands

**Papaver argemone** L. *Sp. Pl.* 506 (1753)!; Smith *Eng. Bot.* no. 643 (1799); *Fl. Brit.* 566 (1800); Syme *Eng. Bot.* i, 91 (1863); Rouy et Foucaud *Fl. France* i, 159 (1893); Fedde *op. cit.* 328 (1909).

Icones :—Smith *Eng. Bot.* t. 643; Curtis *Fl. Lond.* ii, t. 105; *Fl. Dan.* t. 867; *Svensk Bot.* t. 538; Reichenbach *Icon.* iii, t. xiv, fig. 4475.

*Camb. Brit. Fl.* iii. *Plate 174.* (*a*) Lower leaf. (*b*) Fertile shoot. (*c*) Stamens (enlarged). (*d*) Stigmatic disk. Huntingdonshire (E. W. H.).

Exsiccata :—Billot, 1806; 2408; 2408 bis; Bourgeau (*Pl. d'Esp.*), 532; A. Schultz (*Fl. Istr.*), 11; Todaro, 1070; Welwitsch (*Fl. Lusit.*), 1037; Wirtgen xix, 1057.

Annual. *Shoot* about 1·5—4·5 dm. high, with scattered hairs. *Petioles* of the lower leaves about as long as the laminae, upper leaves (or bracts) sessile, not amplexicaul. *Laminae* pinnate, pinnae pinnatifid. *Flowers* 3—6 cm. in diameter; May to August. *Sepals* with scattered bristly hairs. *Petals* brick-red, not contiguous when expanded. *Stigmas* 4—6, very prominent, reaching the margin of the disc. *Capsule* subclaviform, about 2·0 cm. long and 0·5 broad; sessile, with scattered ascending bristly hairs.

*P. maritimum* Withering is simply a small state of *P. argemone*.

(*β*) subvar. **glabrum** comb. nov.; *P. argemone* var. *glabrum* Koch *Syn.* 29 (1835).

*Capsules* with no or very few bristles.

Perhaps this is a hybrid with *P. dubium*.

Cambridgeshire, Lincolnshire (Lees in *Bot. Rec. Club for 1877*, 231 (1878)).

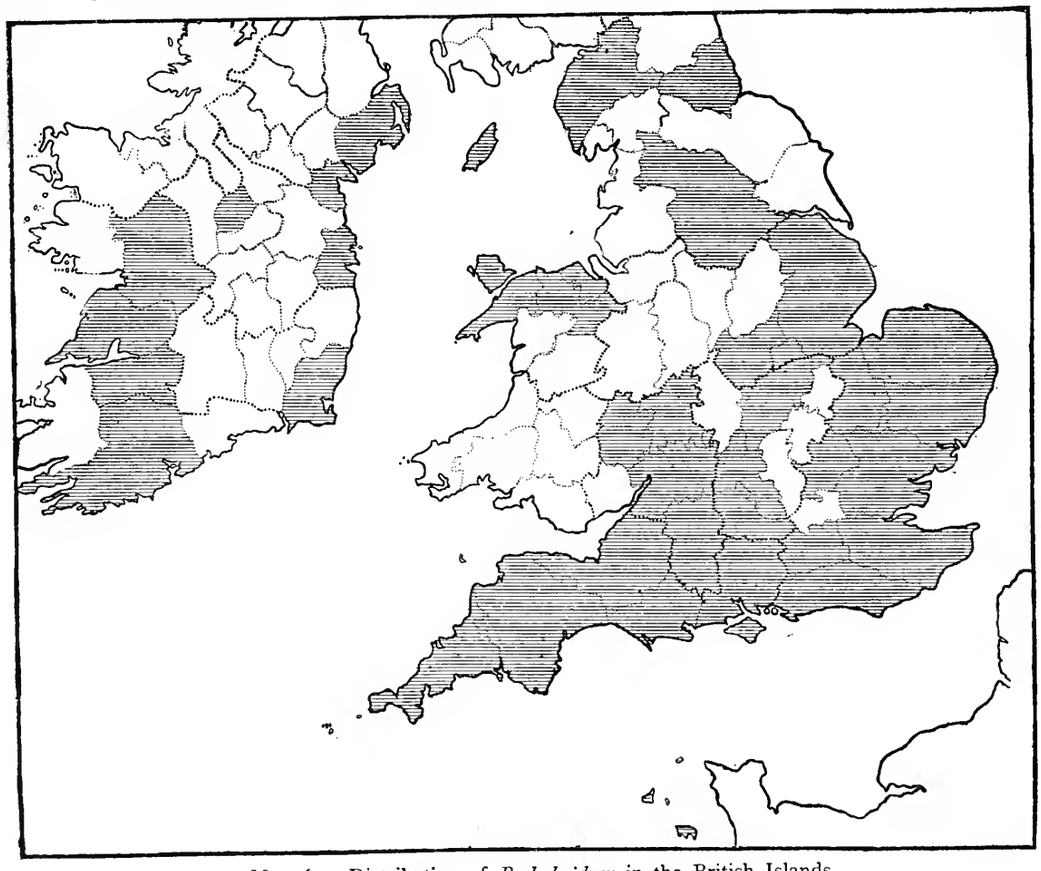
Cornfields, sunny hedgebanks, and waste places, on light sandy or gravelly soils; a lowland plant; the Channel Isles, throughout England, local in Wales, Ireland, and Scotland (northwards to the Hebrides).

Europe (except northern and Arctic); North America (not indigenous).

## 4. PAPAVER HYBRIDUM. Poppy. Plate 175

*Argemone capitulo torulo* Gerard *Herball* 300 (1597); *P. laciniato folio capitulo hispido rotundiore* Ray *Syn.* ed. 3, 308 (1724).

**Papaver hybridum** L. *Sp. Pl.* 506 (1753)!; Smith *Eng. Bot.* t. 43 (1792); *Fl. Brit.* 565 (1800); Syme



Map 65. Distribution of *P. hybridum* in the British Islands

*Eng. Bot.* i, 92 (1863); Fedde *op. cit.* 332 (1909); *P. hispidum* Lamarck *Fl. France* iii, 174 (1778); Rouy et Foucaud *Fl. France* i, 161 (1893).

Icones :—Smith *Eng. Bot.* t. 43; Reichenbach *Icon.* iii, t. 14, fig. 4476.

*Camb. Brit. Fl.* iii. *Plate 175.* (*a*) Fertile shoot, with 2 flower-buds and 3 fruits. (*b*) Flower. Northumberland (E. E.).

Exsiccata :—Billot, 1806; Bourgeau (*Pl. Canar.*), 325, as *P. argemone*; A. Schultz (*Fl. Istr.*), 11; Todaro, 1070; Welwitsch (*Fl. Lusit.*), 1037; Wirtgen, xix, 1057.

Annual. *Shoot* somewhat hairy. *Stem* 1—6 dm. high, erect, with the hairs mostly spreading. *Leaves* not amplexicaul; laminae bipinnatipartite or tripinnatipartite, margin ciliate; segments distinct, lobed; lobes distant, terminal ones smaller than the lateral ones, rather acute. *Pedicels* with mostly appressed hairs. *Flowers* 3—5 cm. in diameter; late May to August. *Sepals* very bristly. *Petals* crimson with a dark purple basal spot, subequal in size, extremely fugaceous, all falling before midday. *Filaments* dilated, dark purple in the upper half. *Anthers* pale bluish after dehiscence. *Stigma-rays* 4—8. *Fruit* simulating the buds in general appearance, broadly elliptical to subglobose, sessile, with prominent ridges and furrows, about 1 cm. long and 0·8 broad, with numerous curved-ascending bristles, bristles tuberculate at the base; stigmatic disc small (about 4 mm. in diameter), very convex.

Rouy and Foucaud (*loc. cit.*) reject the name *P. hybridum* as a *nomen ineptum*—"planta certa non hybrida." We retain all such names, having in mind the following paragraph taken from the International Rules of Botanical Nomenclature:—"Art. 50. No one is authorised to reject, change, or modify a name (or combination of names) because it is badly chosen, or disagreeable, or another is preferable or better known...."

A weed of cornfields, a lowland plant preferring strongly calcareous soils; from Jersey, Cornwall, and Kent northwards to Cumberland and Durham; North Wales; Ireland (local).

Germany, France, southern and southeastern Europe; North America (not indigenous).

## Section II. **SOMNIFERUM*

**Somniferum** nobis; *Mecones* Bernhardi in *Linnaea* viii, 463 (1833); Fedde *op. cit.* 338 (1909).

For characters, see page 162. Only British species:—**P. somniferum.*

## 5. *PAPAVER SOMNIFERUM. Opium Poppy. Plate 176

*P. sylvestre* Johnson in Gerard *Herball* ed. 2, 400 [following 369] (1633); Ray *Syn.* ed. 3, 308 (1724).

**Papaver somniferum** L. *Sp. Pl.* 508 (1753)!; Smith *Fl. Brit.* 568 (1800); Syme *Eng. Bot.* i, 82 (1863); Rouy et Foucaud *Fl. France* i, 152 (1893); Fedde *op. cit.* 338 (1909).

Icones :—Smith *Eng. Bot.* t. 2145; Reichenbach *Icon.* iii, t. 17 (*Papav.*), fig. 4481; fig. 4481 b, as *P. somniferum* var. *laciniatum.*

*Camb. Brit. Fl.* iii. *Plate 176.* (*a*) Fertile branch. (*b*) Flower-bud. (*c*) Flower. (*d*) An outer petal from the largest flower. (*e*) Fruit. (*f*) Stem-leaf. Surrey (C. E. S.).

Exsiccata :—Billot, 2407, as *P. hortense*; Welwitsch (*Fl. Lusit.*), 223.

Annual. *Shoot* glaucous, glabrous below. *Stem* erect, up to nearly 1 m. high. *Leaves* oblong, cordate-amplexicaul, irregularly coarsely and more or less deeply toothed or lobed, often wavy, obtuse, about 16 cm. long and 7 broad. *Pedicel* usually with more or less bristly hairs spreading, rarely glabrous. *Flowers* large, about 5—10 cm. in diameter, often double; June to August. *Sepals* glabrous or rather hairy. *Petals* (rarely 3 or 6) of numerous shades of purple and red, broader than long, entire or more or less lacerate, often with a blotch of darker hue at the base. *Filaments* white. *Stigmas* 8—12. *Stigmatic disc* lobed. *Capsule* large, more or less stalked.

(*β*) subvar. **laciniatum** nobis.

*Laminae* and especially the *petals* laciniate.

Formerly cultivated, and now established locally in southeastern England as a common weed of gardens and waste places; rare and sporadic as a cornfield weed, as in Kent and Surrey; adventitious in the north and in the west of England.

Cultivated and naturalised in the warmer parts of Europe and Asia, and in northern Africa; North America (introduced from the Old World).

## Family 2. FUMARIACEAE

**Fumariaceae** DC. *Syst. Nat.* ii, 105 (1821); Bartling *Ordines Nat. Pl.* 259 (1830); Bernhardi in *Linnaea* viii, 465 (1833); Rouy et Foucaud *Fl. France* i, 169 (1893); *Fumarioïdeae* Al. Braun in Ascherson *Fl. Brandenb.* i, 48 (1864); Prantl und Kündig in *Pflanzenfam.* iii, pt. ii, 137 et 142 (1889).

Perennial or annual herbs, usually glabrous, destitute of latex. *Leaves* spirally arranged (i.e., "alternate"), much divided; leaflets stalked. *Inflorescence* racemose, terminal or leaf-opposed. *Bracteoles* 2, median. *Flowers* transversely zygomorphic, pedicelled. *Sepals* 2, generally caducous, originally median. *Petals* 4; 2 of them outer, larger, and originally lateral; the other 2 inner, smaller, and originally median: the orientation becomes apparently reversed owing to a twist of the pedicel through an angle of 90°; the apparently upper petal prolonged backwards into a swollen nectar-containing spur; outer petals winged, more or less coherent before insect-visitation. *Stamens* 2, originally lateral, each more or less separated at maturity into 3 branches, the middle staminal branch bearing a bilocular anther, the lateral branches with a unilocular half-anther, usually emerging (sometimes, as in *C. capnoïdes*, explosively) on insect-visitation, the lateral stamens (as well as the lateral sepals) suppressed, a staminal outgrowth protecting the nectar. *Ovary* superior, of 2 carpels, unilocular. *Ovules* 2, anatropous. *Fruit* with few or 2 or 1 seeds. *Placentation* parietal. *Embryo* minute. *Cotyledons* linear. *Endosperm* oily.

7 genera, and about 150 species; extra-tropical northern hemisphere, South Africa.

### British genera of *FUMARIACEAE*

Genus 1. **Corydalis** (see below). *Ovules* ∞. *Fruit* a capsule, dehiscing by the two carpels, elongate, strongly compressed laterally. *Seeds* with an aril.

Genus 2. **Fumaria** (p. 171). *Ovules* 2. *Fruit* indehiscent, 1-seeded, subglobose. *Seeds* without an aril.

## Genus 1. Corydalis

**Corydalis** [Dillenius *Cat. Pl. Giss.* app. Tab. 7 (1718);] Ventenat *Choix* 19 (1803); DC. *Fl. France* iv, 636 (1805); Prantl und Kündig in *Pflanzenfam.* iii, pt. 2, 143 et 144 (1891); nomen conservatum; non Medicus *Phil. Bot.* i, 96 (1789); *Fumaria* L. *loc. cit.*, pro max. parte; *Capnoïdes* [Tournefort *Inst.* 423, t. 237 (1700); Adanson *Fam. Pl.* ii, 431 (1763) incl. *Cisticapnos*;] *Neckera* Scopoli *Introd. Hist. Nat.* 313 (1777); *Pseudo-Fumaria* [Rivinus] Medicus *Phil. Bot.* i, 110 (1789).

Perennial or annual herbs. Allied to *Fumaria*, but differing in the following characters. *Flowers* usually larger and more variedly coloured. *Ovules* ∞. *Style* more or less persistent. *Fruit* a capsule, dehiscing by the two carpels, elongate, bilaterally compressed. *Seeds* arillate.

About 90 species; Europe, Asia, Africa.

### Sections of *Corydalis*

Section I. ***Capnites** (see below). *Subterranean tuber* present. *Inflorescence* terminal.

Section II. **Capnoïdes** (p. 169). *Rhizome* slender, tuber not present. *Inflorescence* lateral.

### Section I. **CAPNITES*

**Capnites** DC. *Syst. Nat.* ii, 115 (1821); *Bulbocapnos* Bernhardi in *Linnaea* vii, 604 (1832) as a genus; Rouy et Foucaud *Fl. France* i, 184 (1893).

For characters, see above. Only British species:—**C. bulbosa*.

### 1. *CORYDALIS BULBOSA. Plate 177

**Corydalis bulbosa** DC. *Fl. France* iv, 637 (1805); N. E. Brown in *Eng. Bot.* ed. 3, suppl. 21 (1891); *Fumaria bulbosa* var. *solida* L. *Sp. Pl.* 699 (1753); *F. bulbosa* Miller *Gard. Dict.* ed. 8, no. 8 (1768); *F. solida* Ehrhart *Beitr.* vi, 146 (1791); Smith *Fl. Brit.* 748 (1800); *F. intermedia* Withering *Bot. Arr.* ed. 3, iii, 620, t. 29

(1796); *Corydalis solida* Swartz in *Svensk Bot.* no. 531 (1819); Syme *Eng. Bot.* i, 101 (1863); Rouy et Foucaud *Fl. France* i, 186 (1893).

Icones :—Smith *Eng. Bot.* t. 1471, as *Fumaria solida*; Curtis *Bot. Mag.* t. 231, as *F. solida*; *Svensk Bot.* t. 531, as *C. solida*; *Fl. Dan.* t. 1224, as *F. halleri*; Reichenbach *Icon.* t. 8 (*Papav.*), fig. 4463, as *C. bulbosa.*

*Camb. Brit. Fl.* iii. *Plate 177.* (*a*) Rootlets, corm, and lower part of aërial shoot. (*b*) Barren branch. (*c*) Flowering branch. (*d*) Portion of infructescence. Huntingdonshire (E. W. H.).

Exsiccata :—Billot, 213, as *C. solida*; Rostan, 206, as *C. solida*; Schultz (*H. N.*), iii, 209, as *C. solida*; Thielens et Devos, iii, 216, as *C. solida*; *Herb. Fl. Ingric.*, i, 36, as *C. solida.*

Perennial. *Tuber* remaining solid. *Shoot* 1—2 dm. high, glaucous. *Petioles* about as long as the laminae. *Laminae* 2-ternate or 3-ternate; segments stalked, cuneate, obtuse, 2—3 main lobes each with 2—3 smaller lobes. *Bracts* large (up to nearly 1·5 cm. long and about half as broad), cuneate, acutely lobed. *Racemes* with very long peduncles, with 6—20 flowers. *Flowers* 2·0—2·5 cm. long; March to May. *Sepals* lanceolate. *Petals* lilac (rarely white), darker at the tips; spur long and curved. *Capsule* about as long (about 1·6 cm., including the persistent style) as the fruiting pedicels. *Seeds* black, shining.

Naturalised in a few places (usually near gardens), as far north as the Lake District.

? Denmark, Germany, Holland, Belgium, France, central Europe, Russia (central and southern), southern Europe; Asia.

## Section II. *CAPNOÏDES*

**Capnoïdes** DC. *Syst.* ii, 122 (1821); Rouy et Foucaud *Fl. France* i, 187 (1893).

For characters, see below.

### British species of *Capnoïdes*

2. ***C. lutea** (see below). Perennial. *Leaves* without tendrils. *Pedicels* two-thirds as long as the flowers. *Capsule* 1·5 cm. long. *Seed* with a conspicuous aril.

3. **C. claviculata** (see below). Annual. *Leaves* with tendrils. *Pedicels* a quarter as long as the flowers. *Capsule* 7 mm. long. *Seed* with an inconspicuous aril.

## 2. *CORYDALIS LUTEA. Yellow Fumitory. Plate 178

*Fumaria lutea* Gerard *Herball* 928 (1597).

**Corydalis lutea** DC. *Fl. France* iv, 638 (1805); Syme *Eng. Bot.* i, 102 (1863); Rouy et Foucaud *Fl. France* i, 187 (1893); *F. lutea* L. *Mant. Pl.* ii, 258 (1771); Smith *Eng. Bot.* no. 588 (1799); *Fl. Brit.* 749 (1800).

Icones :—Smith *Eng. Bot.* t. 588, as *Fumaria lutea*; Reichenbach *Icon.* t. 6 (*Papav.*), fig. 4459, as *F. capnoïdes.*

*Camb. Brit. Fl.* iii. *Plate 178.* (*a*) Fertile plant. (*b*) Capsule. (*c*) Portion of fruit opened. Worcestershire (E. W. H.).

Exsiccata :—Billot, 1108, as *C. lutea*; Reichenbach, 2472, as *C. lutea*; Wirtgen, xiv, 782, as *C. lutea.*

Perennial. *Shoot* rather glaucous, about 1—3 dm. high. *Petioles* much longer than the laminae. *Laminae* 2-pinnatisect or 3-pinnatisect; segments stalked, cuneiform, obtuse, with 2—3 lobes. *Racemes* with very long peduncles, with 6—15 flowers. *Bracts* subulate, much shorter than the pedicels. *Flowers* 1·5—2·0 cm. long; April to August. *Sepals* lanceolate-ovate, acute. *Petals* yellow (rarely white), orange at the tips. *Capsule* about as long (1·5 cm.) as the fruiting pedicels. *Seeds* black, shining, finely granular; aril large.

Naturalised, especially on old walls (usually near gardens) in many places in the lowlands of England and here and there in Scotland.

Germany, Belgium (not indigenous), France, Switzerland, Italy.

## 3. CORYDALIS CLAVICULATA. Climbing Fumitory. Plate 179

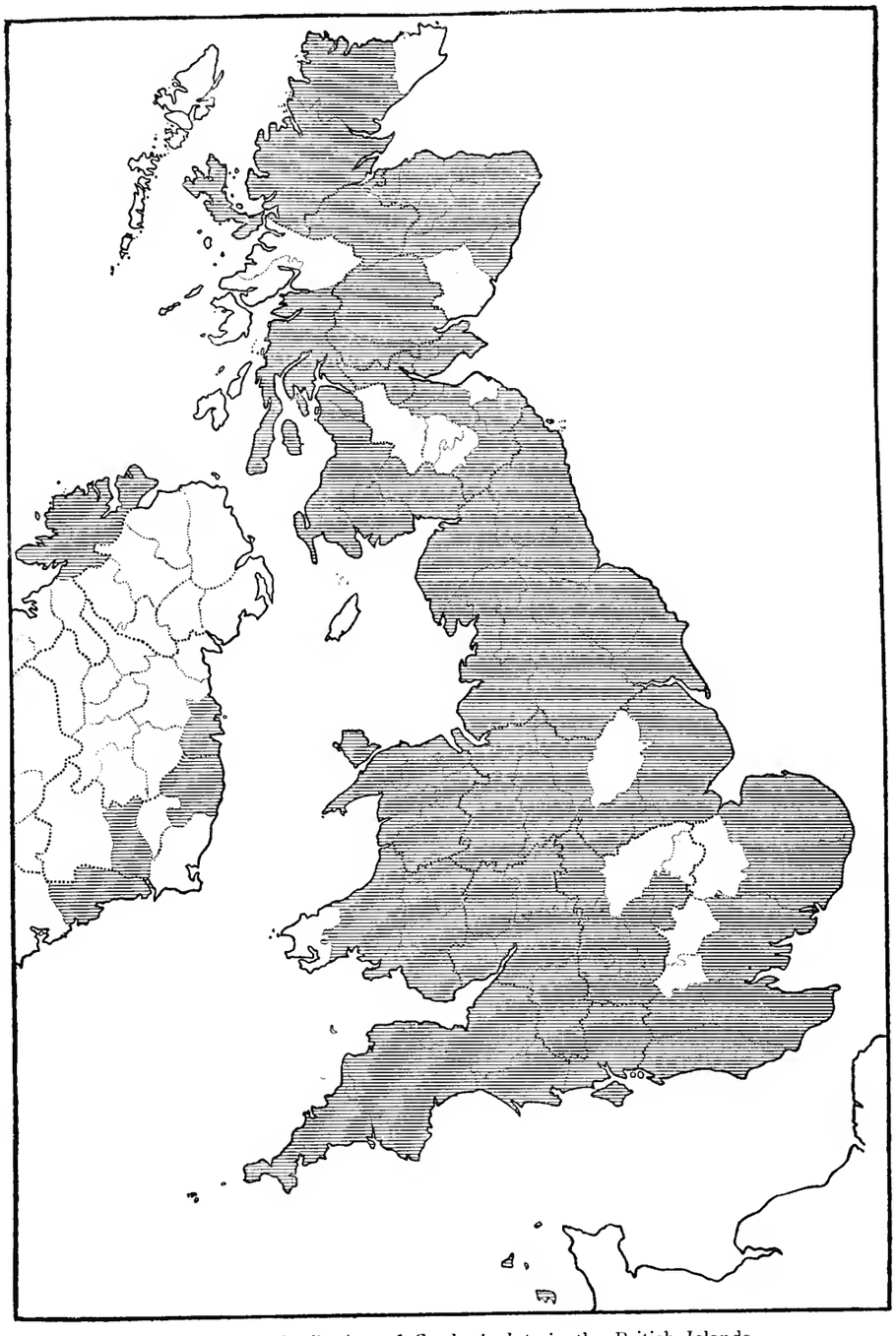
*Fumaria alba latifolia* Gerard *Herball* 929 (1597); Ray *Syn.* ed. 3, 335 (1724); *F. alba latifolia claviculata* Johnson in Gerard *Herball* ed. 2, 1088 (1633).

**Corydalis claviculata** DC. *Fl. France* iv, 638 (1805); Syme *Eng. Bot.* i, 103 (1863); Rouy et Foucaud *Fl. France* i, 188 (1893); *Fumaria claviculata* L. *Sp. Pl.* 701 (1753); Smith *Eng. Bot.* no. 103 (1793); *Fl. Brit.* 752 (1800).

Icones :—Smith, *Eng. Bot.* t. 103, as *Fumaria claviculata*; *Fl. Dan.* t. 340, as *F. claviculata*; Reichenbach *Icon.* t. 5 (*Papav.*), fig. 4457.

*Camb. Brit. Fl.* iii. *Plate 179.* (*a*, *b*) Fertile shoots. (*c*) Infructescence. *a* from the West Riding of Yorkshire (E. W. H.): *b*—*c* from Surrey (E. W. H.).

Exsiccata :—Billot, 1807; Fries, xiii, 46; Reichenbach, 884; Thielens et Devos, iii, 217; Wirtgen, ix, 439.



Map 66. Distribution of *C. claviculata* in the British Islands

Annual. *Shoot* rather glaucous. *Stem* weak, diffuse, very leafy, 2—6 dm. long. *Petioles* much shorter than the laminae. *Laminae* pinnatisect; pinnae opposite at least below, upper ones often alternate, terminal ones modified into tendrils; segments sessile, elliptical-acute, about 10 mm. long and 3 broad. *Racemes* with long peduncles, with about 10—20 flowers. *Bracts* small (3 mm. long or rather less). *Pedicels* shorter than the bracts. *Flowers* about 7—9 mm. long; April to August. *Sepals* very small (about 2 mm. long, and nearly as broad at the base). *Petals* pale yellow to nearly white, spur very short (ca. 1 mm.). *Capsule* about 6—8 mm. long, about four times as long as the fruiting pedicels. *Seeds* black, shining, minutely granulate; aril very small.

Open oak and birch woods and scrub, and hedgerows; on dry, rocky, siliceous, or sandy soils; avoiding heavy and calcareous soils; rather local, from the Channel Isles, Cornwall and Kent northwards to Sutherlandshire, but rare or absent in several counties (e.g., Cambridgeshire and

Huntingdonshire) in eastern England; local in Ireland, from co. Waterford to co. Dublin, with an outlier in co. Donegal.

South-western Norway, Denmark, northern Germany, Holland, Belgium, France, north-western Spain, Portugal.

## Genus 2. Fumaria

By H. W. PUGSLEY, B.A.

**Fumaria** [Tournefort *Inst.* 421, t. 237 (1700) partim] L. *Sp. Pl.* 699 (1753) et *Gen. Pl.* ed. 5, 314 (1754) pro min. parte; Gaertner, *Fruct.* ii, 162 (1791) partim; DC. *Syst. Nat.* ii, 130 (1821) partim; Bernhardi in *Linnaea* viii, 471 (1833); Hammar in *Nov. Act. Upsal.* ser. 3, ii, 258 (*Monogr. Gen. Fumit.*[1] 2) (1857); Bentham and Hooker *Gen. Pl.* i, 56 (1862) partim; Prantl und Kündig in *Pflanzenfam.* iii, pt. ii, 143 et 145 (1891) partim; Rouy et Foucaud *Fl. France* i, 170 (1893); Pugsley in *Journ. Bot.* l, suppl. i (*Fumaria in Britain*[2] 1 et 5) (1912).

Annual, rarely perennial herbs, usually of diffuse habit, often climbing by twisted petioles. *Leaves* alternate, upper sessile, all irregularly 2—3 (rarely 4) pinnatisect, with leaflets cut into lobes of greatly varying breadth. Pedicels bracteate. Bracts membranous. *Flowers* homogamous, and frequently more or less cleistogamous. *Sepals* membranous, 1-nerved. *Petals* white or pink, variously marked with blackish-red or purple about the apex; "upper" one only with the basal spur, and with a thickened green keel towards the apex, with margins generally produced as wings which are either patent or reflexed upwards over the keel; "lower" one much narrower than the "upper" one, channelled, with a green keel towards the apex, with margins sometimes obsolescent and erect, sometimes broader and spreading outwards; inner petals both alike, narrow at the base but broader above with 3 winged nerves, coherent at the apex and connate below with the "upper" petal. *Stamens* included, the "upper" often provided with a nectary. *Filament* opposite the spurred petal also spurred. *Style* caducous, filiform, not exserted. *Stigma* 2-lobed. *Fruit* indehiscent, subglobose but somewhat laterally compressed, 1-seeded, with a small cleft in the "mesocarp" at each side of the apex appearing as a small hollow or pit when dry, and with the "exocarp" frequently furnished with tubercles. *Seed* without an aril. *Cotyledons* linear.

All the British species belong to the section *Sphaerocapnos* (DC. *Syst. Nat.* ii, 131 (1821)) which comprises all the annual fumitories with a racemose inflorescence and subglobose fruits, and contains about 40 species. The members of the section *Petrocapnos* (Cosson in *Bull. Bot. Soc. France* ii, 305 (1855)) are perennial plants with short stems and a corymbose inflorescence: they are confined to northern Africa and southern Spain.

The confusion that has commonly attended the identification of plants of this genus is largely due to their general tendency to cleistogamy, involving a depauperation of the corolla. A perfect flower of *Fumaria* has the corolla fully coloured and winged, and provided with a nectary; and the lower petal is deflexed and free. In some species, the nectary is rarely present; and, in all, the four petals frequently remain coherent. Moreover, when a fumitory is growing in uncongenial conditions, not only do its four petals cohere, but they may fail to reach their normal size and to develop their characteristic wings and colouring. They then appear quite unlike their normal form. As the flowers in the British forms are uniformly self-pollinated, however, the fruit in such cases is unaffected; and the flowers, at least in the British Isles, appear to be rarely visited by insects. As might be consequently expected, hybrids are of rare occurrence; and the few individuals that have been determined as hybrids have been entirely barren.

In the British Isles, all the fumitories are primarily weeds of cultivated ground; but the large-flowered species also occur on hedgebanks and walls and other situations where the surface soil is subject to periodical disturbance. In suitable seasons and according to the tillage of the ground, all the species may be found in flower from spring to autumn; but a considerable degree of moisture is necessary for the germination of the seeds; and in dry summers they are often absent from their accustomed haunts.

About 45 species; throughout Europe, except the extreme north; western and central Asia; North Africa, Atlantic Islands; America (not indigenous).

### British subsections of *Sphaerocapnos*

Subsection i. **Grandiflora** (p. 172). *Leaf-segments* flat, broadly oval to oblong or lanceolate, frequently mucronate. *Flowers* normally larger than those of *F. officinalis*, exceeding 9 mm. in length. *Upper petal* (in good flowers) with wings upwardly reflexed. *Lower petal* with erect or spreading margins, little (if at all) dilated towards the apex. *Inner petals* more or less curved upwards.

Subsection ii. **Parviflora** (p. 183). *Leaf-segments* flat or channelled, oblong or lanceolate to linear or setaceous, occasionally mucronate. *Flowers* not larger than those of *F. officinalis*, not

[1] This is the separate copy, which is differently paged from the original.

[2] This is the separate copy, and is paged as in the original.

exceeding 9 mm. in length. *Upper petal* with wings less reflexed upwards than in *Grandiflora*, often more or less patent. *Lower petal* with spreading margins distinctly dilated towards the apex in a spathulate outline. *Inner petals* nearly straight and relatively broader than in *Grandiflora*.

### Subsection i. *GRANDIFLORA*

**Grandiflora** Pugsley in Moss *Camb. Brit. Fl.* iii, 172; *Capreolatae* Hammar *Monogr.* 24 et 37 (1857) incl. *Agrariae*, as "sections"; Rouy et Foucaud *Fl. France* i, 171 (1893); *Latisectae* Haussknecht in *Flora* lvi, 513 (1873); *Grandiflorae* Pugsley *Fumit. Brit.* 5 (1912) as a section.

For characters see page 171.

### Series of *Grandiflora*

Series i. **Agrariae** (see below). *Pedicels* much thickened upwards, generally erect-spreading in fruit. *Sepals* rarely exceeding one-third of the length of the corolla. *Lower petal* with spreading and more or less broad margins which reach and are sometimes a little dilated towards the apex. *Fruit* large, and (when dry) coarsely tubercular-rugose.

Series ii. **Capreolatae** (p. 173). *Peduncles* relatively long. *Pedicels* much thickened upwards, more or less recurved in fruit. *Sepals* large, exceeding one-third of the length of the corolla, relatively but little toothed. *Lower petal* with erect and narrow margins not reaching the apex. *Fruit* small or of moderate size; when fresh, with a distinct fleshy neck narrower than the dilated tip of the pedicel, and, when dry, smooth or nearly so.

Series iii. **Murales** (p. 177). *Pedicels* rarely much thickened upwards, generally erect-spreading in fruit. *Flowers* of the later racemes sometimes notably fewer and less developed than those preceding them. *Sepals* rarely exceeding one-third of the length of the corolla. *Lower petal* with narrow, erect or spreading margins not reaching the apex. *Fruit* small or of moderate size; when fresh, with an indistinct fleshy neck, and, when dry, varying from smooth to tubercular-rugose.

### Series i. *AGRARIAE*

**Agrariae** Haussknecht in *Flora* lvi (new series xxxi), 550 (1873); Hammar *Monogr.* 37 (1857); as a section; Pugsley *Fumit. Brit.* 42 (1912) as a subsection.

Both in corolla and in fruit some members of this series approach the perennial species of the section *Petrocapnos*.

For characters, see above. Only British species:—*F. occidentalis*.

## 1. FUMARIA OCCIDENTALIS. Plate 180

**Fumaria occidentalis** Pugsley in *Journ. Bot.* xlii, 217 (1904); *Fum. Brit.* 43 (1912).

Icones:—Pugsley in *Journ. Bot.* xlii, t. 462.

*Camb. Brit. Fl.* iii. *Plate 180.* (*a*) Fertile branch. (*b*) Infructescence. (*c*) Flowers (enlarged). (*d*) Lower petal in profile (enlarged). (*e*) Lower petal from above (enlarged). (*f*) Sepals (three enlarged). (*g*) Fresh fruits (enlarged). (*h*) Dried fruits (enlarged). Cornwall (C. C. V.).

Exsiccata:—Dörfler, 4814, as *F. occidentalis*; herb. Pugsley, 115.

Annual. *Stem* robust, suberect, decumbent or climbing by its cirrhose petioles to a height of 1—2 m. *Leaves* light green; lobes of the leaflets oblong-lanceolate, acute or mucronate. *Racemes* with 10—20 flowers, rather lax, lengthening in fruit, about as long as the peduncles. *Bracts* linear-lanceolate, acuminate. *Fruiting pedicels* usually a little longer than the bracts, straight and suberect, or occasionally patent-recurved. *Flowers* from May to October. *Sepals* ovate, peltate, acute, frequently incise-dentate towards the base, 4—5½ mm. long, 2—3 mm. broad. *Corolla* rosy-white with the tip of the inner petals blackish-red and the wings of the upper one similarly coloured externally with broad white margins, large and handsome, 12—14 mm. long; upper petal broad, subacute, with broad short wings reaching the apex and exceeding the keel; spur relatively short; lower petal with broad spreading whitish margins, often deflexed and free. *Fruit* subrotund, large, 3 mm. long and as broad (when dry), when fresh, with an obscure neck, subacute; when dry, keeled-compressed, with the keel drawn into a very short notched beak, coarsely rugose with very shallow apical pits beneath each of which is a conspicuous tubercle.

Prior to 1904, the presence of an Agrarian fumitory in this country was quite unsuspected; and its occurrence in Cornwall is a remarkable and interesting extension of the range of the series which is otherwise confined to the immediate vicinity of the Mediterranean, except in the case of *F. agraria*, which reaches Portugal. From the restriction of *F. occidentalis* to the warmest districts in Cornwall it is clear that, like the other species of the *Agrariae*, it is unable to withstand severe

cold. The earliest known specimen of *F. occidentalis* was collected at Newlyn, Cornwall, in 1881; but there is evidence that long previously it was locally known as an unusually beautiful weed of cultivation. It is, in fact, the finest of the British fumitories.

Endemic in western Cornwall where it extends, never growing far inland, from the neighbourhood of Padstow round the Land's End nearly to the Lizard.

### Series ii. *CAPREOLATAE*

**Capreolatae** Haussknecht in *Flora* lvi, 539 (1873); Hammar *Monogr.* 24 (1857) as a "section"; Pugsley *Fumit. Brit.* 5 (1912) as a subsection.

For characters, see page 172.

#### British species of *Cabreolatae*

2. **F. capreolata** (see below). *Racemes* dense, shorter than the peduncles. *Fruiting pedicels* normally arcuate-recurved. *Corolla* white; upper petal narrow, with wings not covering the keel. *Fruit* usually smooth, with small but well-marked apical pits.

3. **F. purpurea** (p. 175). *Racemes* not dense, about as long as the peduncles. *Fruiting pedicels* patent-recurved or divaricate. *Corolla* purplish; upper petal rather broad, with wings exceeding the keel. *Fruit* faintly rugulose, with broader and shallower pits than in *F. capreolata*.

## 2. FUMARIA CAPREOLATA. Ramping Fumitory. Plate 181

**Fumaria capreolata** L. *Sp. Pl.* 701 (1753); Hammar *Monogr.* 24 (1857); Rouy et Foucaud *Fl. France* i, 171 (1893); Pugsley *Fum. Brit.* 6 (1912).

Annual. *Stem* sparingly branched, diffuse or suberect and climbing to a height of 1—2 m., internodes long. *Leaves* light green or rarely glaucescent; lobes of the leaflets broad, oblong or cuneiform, acute or mucronate. *Racemes* dense, with up to 20 flowers, mostly shorter than the peduncles. *Bracts* linear-lanceolate, acuminate. *Fruiting pedicels* never much longer than the bracts, strongly arcuate-recurved but occasionally (generally in shade) straight and divaricate. *Flowers* from May to September. *Sepals* ovate-oblong or oval, peltate, more or less toothed about the base but otherwise subentire, acute, 4—6 mm. long, 2·5—3·0 mm. broad. *Corolla* creamy-white, with the tip of the inner petals and the wings of the upper one blackish-red, and frequently a reddish dorsal suffusion, often rather persistent and falling with the fruit, 10—13 mm. long; upper petal narrow, acute, its wings not reaching the apex and not covering the keel; lower petal with erect and narrow margins. *Fruit* small or of moderate size, obscurely keeled, very obtuse or truncate; when fresh, with a distinct neck much narrower than the dilated tip of the pedicel; when dry, smooth or nearly so, with very small but well-marked apical pits.

Linnaeus (*loc. cit.*) cites *F. major scandens flore pallidiore* (Ray *Syn.* ed. 3, 204 (1724)) for this species, but it is doubtful whether Ray actually meant *F. capreolata* by this, his "greater ramping fumitory." A specimen so named in the contemporary herb. Buddle (Herb. Sloane xi, 48, in Herb. Mus. Brit.) and one in the herb. Dubois at Oxford are merely rampant forms of *F. officinalis*. In the latter collection, *F. capreolata* var. *babingtoni* is represented, and is given another ms. pre-Linnaean name.

(*a*) **F. capreolata** var. **pallidiflora** Crépin *Fl. Belg.* ed. 4, 53 (1882); *F. pallidiflora* Jordan in Schultz *Arch.* 305 (1854) non Babington; *F. capreolata* Hammar Mon. 24 (1857) excl. vars.: Pugsley *Fum. Brit.* 9 (1912) excl. vars

Icones:—Savi *Mat. Med.* t. 1, fig. 1, as *F. capreolata*; *Fl. Dan.* t. 2359, as *F. capreolata* (this is a pale-flowered shade form); Sturm *Deutschl. Fl.* i, 62, t. 13, as *F. capreolata*.

Exsiccata:—Bourgeau (*Pyr.-Esp.*), 391, as *F. capreolata*; Heldreich (*Hb. Graec.*), 1003, as *F. capreolata*; Reverchon (*Pl. Corse*), 53, as *F. capreolata*; *Fl. Austr.-Hung.*, 2899, as *F. capreolata*.

*Bracts* usually a little shorter than the fruiting pedicels. *Sepals* normally broadly oval, less than half as long as the corolla. *Corolla* often dorsally marked with rosy red; upper petal with wings scarcely equalling the abruptly acute keel. *Fruit* subrotund, little compressed laterally, very obtuse but not truncate, smooth when dry, small, 2 mm. long and a little less in breadth.

The allied *F. capreolata* var. *speciosa* Hammar *Monogr.* 25 (1857) (= *F. speciosa* Jordan *Cat. Grenoble* 15 (1849)) has been reported for Guernsey; but its existence there needs confirmation. It is distinguished chiefly by its corolla readily turning to bright crimson.

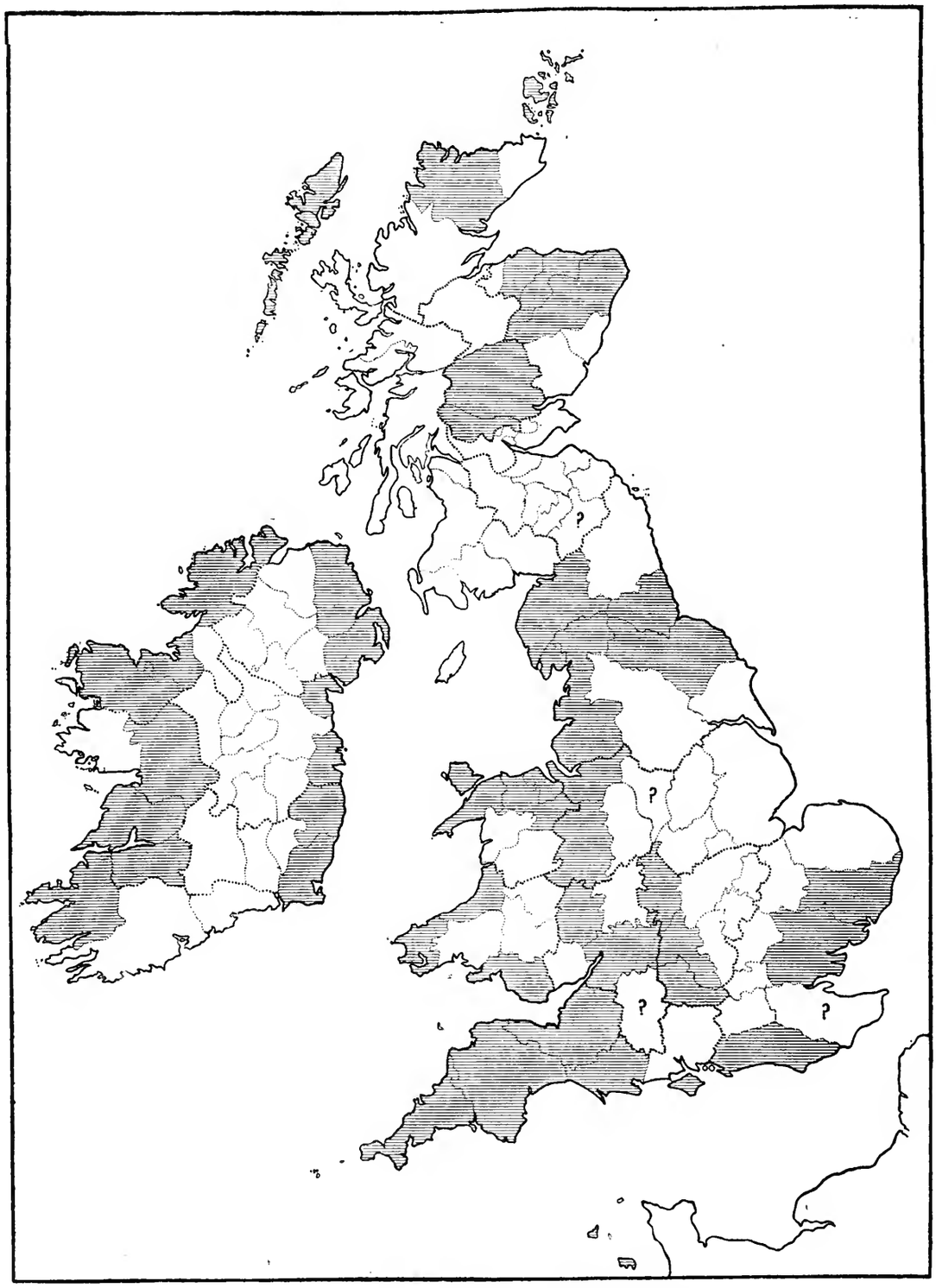
Channel Isles (Guernsey only).

On the continent of Europe, this is the typical form of the species.

(*b*) **F. capreolata** var. **babingtoni**[1] Pugsley *Fum. Brit.* 9 (1912); *F. pallidiflora* Babington in *Journ. Linn. Soc.* iv, 162 (1860) non Jordan; *F. capreolata* subsp. *pallidiflora* Syme *Eng. Bot.* i, 105 (1863).

Exsiccata :—Herb. Pugsley, 45, 52, 59; Praeger, *Ann.* 1905, in *Herb. Mus. Brit.*, as *F. capreolata.*

*Bracts* about as long as the fruiting pedicels. *Sepals* mostly oval, about half as long as the corolla. *Corolla* less brightly coloured than in var. *pallidiflora*; upper petal very narrow, with wings distinctly falling short of the attenuate and very acute keel. *Fruit* truncate, somewhat rectangular




Map 67. Distribution of *F. capreolata* in the British Islands

in profile, more laterally compressed than in var. *pallidiflora*, when dry sometimes obscurely rugulose, of moderate size, fully 2·5 mm. long and over 2·0 broad.

(*β*) var. **babingtoni** subvar. **divaricata** Pugsley *Fum. Brit.* 10 (1912).

Exsiccata :—Herb. Pugsley, 66.

[1] After C. C. Babington (1808—1895), Professor of Botany at the University of Cambridge from 1861 to 1895.

*Fruiting-pedicels* not normally arcuate-recurved, but variable in direction and generally straight and divaricate.

This variety, the ordinary British form of the species, is a less beautiful plant than the var. *pallidiflora* owing to the duller colouring of the flowers. The figure in Syme *Eng. Bot.* i, t. 71 (as *F.* [*capreolata* subsp.] *pallidiflora*) is very unsatisfactory.

Throughout the British Islands. Not known elsewhere. The subvar. *divaricata* is known only from Penzance, Cornwall.

(*c*) **F. capreolata** var. **devoniensis** Pugsley *Fum. Brit.* 10 (1912).

Icones :—*Camb. Brit. Fl.* iii. *Plate 181.* (*a*) Fertile shoot. (*b*) Inflorescence. (*c*) Flower (enlarged). (*d*) Lower petals in profile (enlarged). (*e*) Lower petal from above (enlarged). (*f*) Sepals (enlarged). (*g*) Fresh fruit (enlarged). (*h*) Dried fruits (enlarged). Devonshire (H. W. P.).

Exsiccata :—Herb. Pugsley, 73.

*Bracts* about as long as the fruiting pedicels which are irregularly recurved. *Flowers* as in var. *babingtoni*, but more suffused with pink. *Fruit* subrotund, rounded-obtuse but scarcely truncate and rather narrowed below, little compressed laterally, and when dry obscurely rugulose; of moderate size, about 2·5 mm. long and broad.

Rare; at present only known from the north of Devonshire.

Rather local; cultivated ground, hedgebanks, and old walls, chiefly in the Old Red Sandstone districts; from the Channel Isles and Cornwall, northwards to Orkney; rare in southern and eastern England where it may have been introduced; local in Ireland.

Southern Sweden (rare), Denmark (rare), Germany (rare), and Europe generally south and west of the Rhine; northern Africa (Morocco and Algeria); Asia Minor (incl. Syria); adventitious in North America (Florida) and in South America.

## 3. FUMARIA PURPUREA. Plate 182

**Fumaria purpurea** Pugsley in *Journ. Bot.* xl, 135 et 179 (1902); *Fum. Brit.* 12 (1912); *F. boraei* Babington in *Journ. Linn. Soc.* iv, 163 (1860) non Jordan; *F. capreolata* subsp. *boraei* Syme *Eng. Bot.* i, 106 (1863).

Annual. *Stem* normally less rampant and more branched than in *F. capreolata*. *Leaves* light green; segments rather narrower than in *F. capreolata*. *Racemes* rather lax, with many (often 20—24) flowers, nearly equalling the peduncles. *Fruiting pedicels* never much longer than the bracts, patent-recurved or divaricate. *Flowers* sometimes much smaller in the later racemes; May to October. *Sepals* oblong or oval, peltate, shortly acute or rounded-obtuse, with a broad median band or suffusion of green, 4·5—6·5 mm. long, 2—3 mm. broad. *Corolla* pale purplish-pink or purple, with the tip of the inner petals and the wings of the upper one dark purple, 10—13 mm. long; upper petal rather broad, with wings scarcely reaching the apex but exceeding the keel, acute; lower petal with erect and narrow margins. *Fruit* nearly square in profile, truncate or occasionally subemarginate, laterally compressed but obscurely keeled; when fresh, with a distinct neck much narrower than the dilated tip of the pedicel; when dry, faintly rugulose with rather small and shallow though distinct apical pits; of moderate size, about 2·5 mm. long and as broad or a little broader.

(*a*) **F. purpurea** var. **longisepala** Pugsley in *Camb. Brit. Fl.* iii, 175; *F. purpurea* Pugsley *Fum. Brit.* 12 (1912) excl. var. *brevisepala*.

*Camb. Brit. Fl.* iii. *Plate 182.* (*a*) Flowering branch. Cornwall (C. C. V.). (*b*) Flowering branch. (*c*) Infructescence. (*d*) Flowers (enlarged). (*e*) Lower petal in profile (enlarged). (*f*) Sepals (four enlarged). (*g*) Fresh fruits (enlarged). (*h*) Dried fruits (enlarged). Devonshire (H. W. P.).

Exsiccata :—Herb. Pugsley, 94, 101, 108.

*Bracts* linear-lanceolate, acuminate, equalling the fruiting pedicels, except the lowest, which are generally rather longer and occasionally much so and becoming foliaceous. *Sepals* oblong, usually sparingly toothed about the base and subentire towards the apex, often rounded-obtuse, 5·0—6·5 mm. long.

The plate in Syme *Eng. Bot.* t. 72 [bis] as *F.* [*capreolata* subsp.] *boraei* is a reproduction of Jordan's *F. boraei*, as shown in Smith *Eng. Bot.* t. 943, with the addition of dissections apparently of *F. purpurea* var. *longisepala*.

There is an example of this variety in herb. Dillenius at Oxford, and a still earlier specimen (ca. 1700) in herb. Dubois also at Oxford. The latter is annotated *F. major scandens floribus albis riche saturate purpureo*, an interesting allusion to the characteristic coloration of the corolla.

This variety is the usual form of the species. Its flowers vary considerably in size, and a forma *grandiflora* occurs in which they are very handsome and richly coloured.

Local, from Cornwall to Orkney; Ireland. Not known elsewhere.

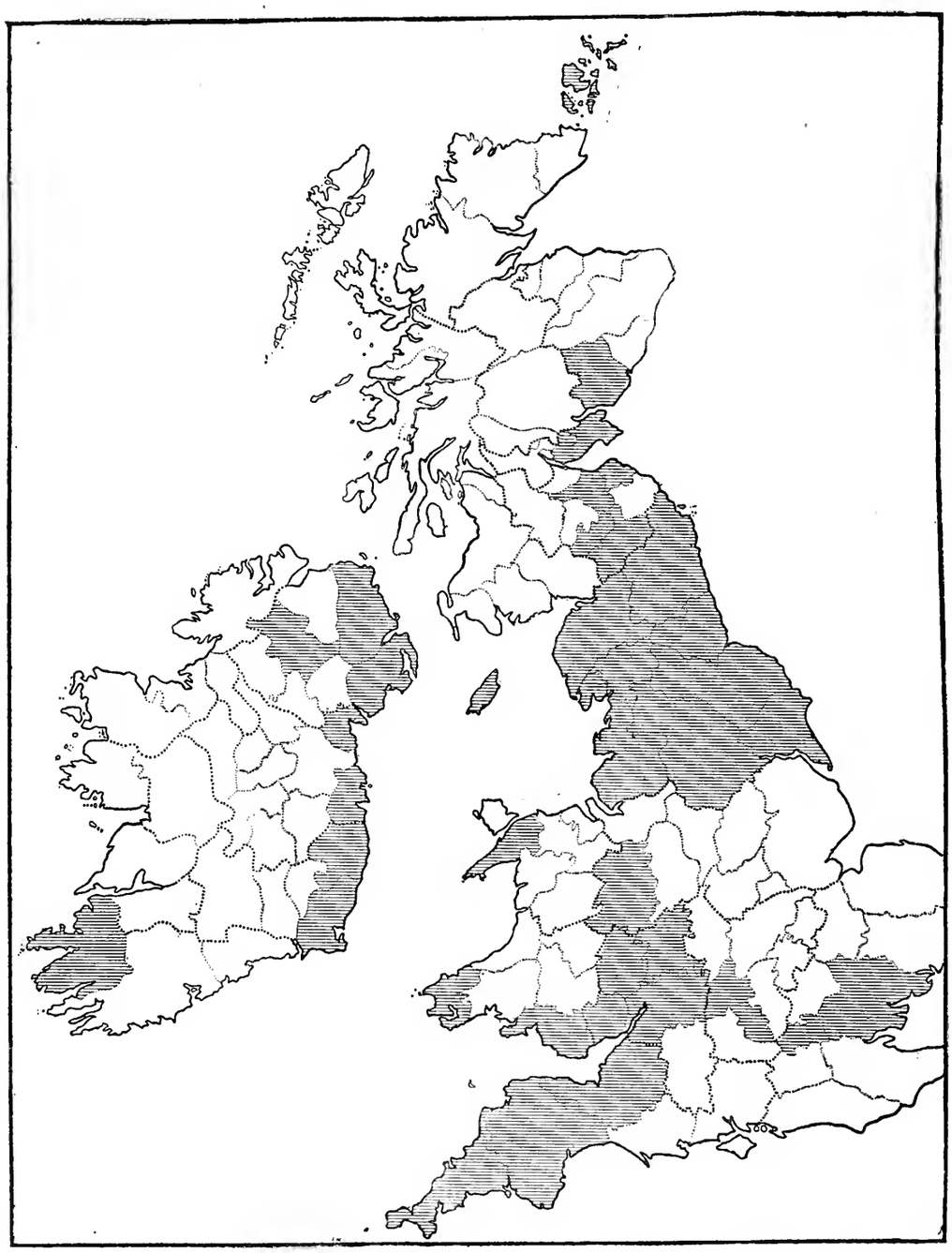
(*b*) **F. purpurea** var. **brevisepala** Pugsley *Fum. Brit.* 13 (1912).

Exsiccata :—Herb. Pugsley, 122.

*Bracts* broad, nearly oblong, subacute or mucronate, rather shorter than the fruiting pedicels. *Sepals* broadly oval, subacute, more or less toothed or denticulate, 4·5—5·0 mm. long.

Owing to its smaller sepals, the general aspect of the flowers of this variety recalls *F. muralis* subsp. *boraei* rather than *F. capreolata*.

Rare; Cornwall, Shropshire, Carnarvonshire; Ireland—co. Dublin.



Map 68. Distribution of *F. purpurea* in the British Islands

*F. purpurea* is endemic in the British Islands but is nowhere very abundant. Its headquarters in Great Britain are, as in the cases of the other large-flowered species, the Old Red Sandstone districts of Cornwall and Devonshire, the Welsh border, the Lake District, eastern and central Scotland, and Orkney; it is rare and local in eastern England; in Ireland, it occurs in co. Kerry, and from co. Wexford to co. Antrim and co. Tyrone.

Series iii. *MURALES*

**Murales** Haussknecht in *Flora* lvi, 513 (1873) as a "section"; *Mediae* Pugsley *Fumit. Brit.* 15 (1912) as a subsection.

For characters, see p. 172.

BRITISH SPECIES OF *Murales*

4. **F. bastardi** (see below). *Racemes* many-flowered, exceeding the peduncles. *Sepals* oval, serrate. *Upper petal* laterally compressed. *Lower petal* with narrow spreading margins. *Fruit* rugose, with broad apical pits.

5. **F. martini** (p. 179). *Racemes* many-flowered, exceeding the peduncles. *Sepals* oval, subentire. *Upper petal* obscurely dorsally compressed. *Lower petal* with very narrow spreading margins. *Fruit* smooth or rugulose, with moderate apical pits.

6. **F. muralis** (p. 179). *Racemes* generally few-flowered, about equalling the peduncles (or, if many-flowered, with shorter peduncles and small blunt corollas). *Sepals* ovate or broadly oval, usually more or less dentate. *Upper petal* dorsally compressed, with a spathulate dilation of the wings. *Lower petal* with very narrow and usually erect margins. *Fruit* smooth or obscurely rugulose, with small apical pits.

## 4. FUMARIA BASTARDI. Plate 183

**Fumaria bastardi** Boreau in Duchartre's *Rev. Bot.* ii, 359 (1846—1847) excl. var. *β*; *Fl. Centr. France* ed. 3, ii, 34 (1857); Rendle and Britten in *Journ. Bot.* xlv, 99 (1907); Pugsley *Fum. Brit.* 35 (1912); *F. gussonii* Haussknecht in *Flora* lvi, 513 (1873).

*Stem* erect or diffuse, rarely climbing. *Leaves* light green or glaucescent. *Racemes* rather lax, normally with 15—25 flowers, exceeding the peduncles. *Bracts* linear-oblong, cuspidate. *Fruiting pedicels* usually twice as long as the bracts, straight, suberect or erect-spreading. *Flowers* from May to October. *Sepals* oval, scarcely peltate, serrate, acute, often persisting on the young fruit, about 2—3 mm. long and 1·5—2·0 broad. *Corolla* pink, 9—11 mm. long; upper petal narrow, laterally compressed, not spathulate in bud, wings produced towards the base and often reaching the apex and exceeding the keel; spur longer than the sepals; lower petal with narrow but spreading margins. *Fruit* rotundate; when dry, rugose with broad and shallow apical pits; in size moderate or small.

(*a*) **F. bastardi** var. **confusa** Pugsley in Moss *Camb. Brit. Fl.* iii, 177; *F. bastardi* Boreau in Duchartre *Rev. Bot. loc. cit.*, in s. str.; Pugsley *Fum. Brit.* 40 (1912) excl. vars.; *F. confusa* Jordan *Cat. Dijon.* 18 (1848); Pugsley in *Journ. Bot.* xl, 173 (1902); *F. muralis* race *confusa* Rouy et Foucaud *Fl. France* i, 175 (1893); *F. agraria* Mitten in *Lond. Journ. Bot.* vii, 556 (1848) non Lagasca; *F. media* var. *confusa* Hammar *Mon.* 28 (1857) non *F. media* Loiseleur.

Icones:—*Camb. Brit. Fl.* iii. *Plate 183.* (*a*) Fertile branch. (*b*) Inflorescence. (*c*) Infructescence. (*d*) Flower (enlarged). (*e*) Lower petal in profile (enlarged). (*f*) Lower petal from above (enlarged). (*g*) Sepals (enlarged). (*h*) Fresh fruit (enlarged). (*i*) Dried fruits (enlarged). Channel Isles (E. W. H.).

Exsiccata:—Billot, 3307 bis, as *F. bastardi*; Schultz (*H. N.*), vii, 605, as *F. confusa*; herb. Marshall, 2741, as *F. confusa.*

*Leaf-segments* oblong, rather narrow. *Sepals* oval, about 3 mm. long and 1·5 broad. *Corolla* with the tip of the inner petals only blackish-red and the wings of the upper one pink like the rest of the corolla, 10—11 mm. long. *Fruit* subacute or occasionally rounded-obtuse, little narrowed below to an obscure broad fleshy neck equalling the tip of the pedicel, 2·5 mm. long and equally broad.

This variety is the ordinary British form of the species, and is very easily distinguished when in flower by its inner petals alone being tipped with dark red.

Throughout Great Britain, principally western; widely distributed in Ireland.

(*b*) **F. bastardi** var. **gussonii** Pugsley *Fum. Brit.* 40 (1912); *F. gussonii* Boissier *Diagn. Orient.* ii, fasc. 8, 13 (1849); Hammar *Monogr.* 34 (1857); *F. muralis* race *gussonii* Rouy et Foucaud *Fl. France* i, 175 (1893).

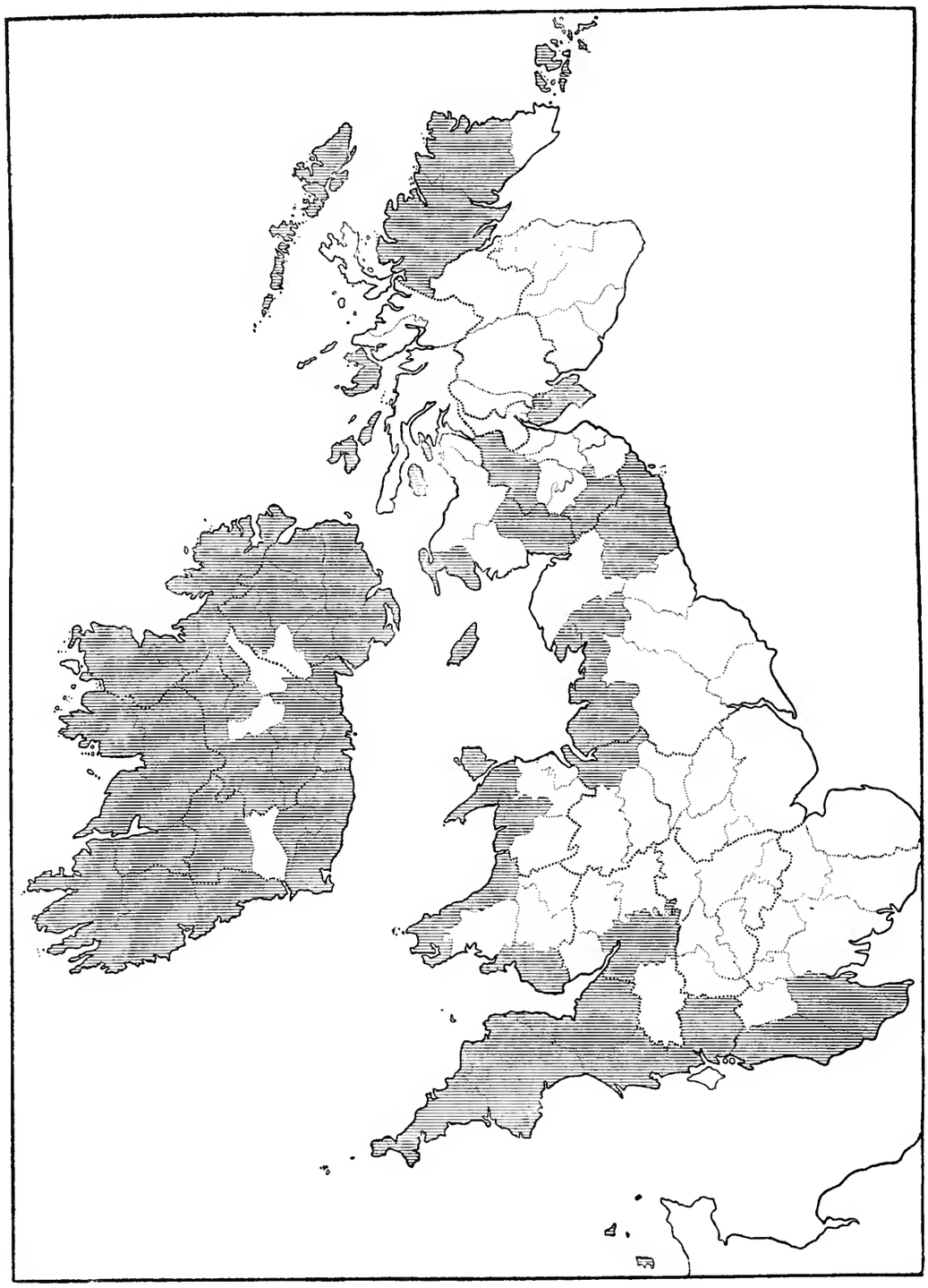
Exsiccata:—Billot, 1109, as *F. gussonii*; Fiori, etc. (*Fl. Ital.*), 827, as *F. serotina* var. *gussonii*; Lojacono (*Pl. Ital. Select.*) 74, as *F. gussonii*; herb. Pugsley, 150, 157.

Usually of dwarf habit. *Leaf-segments* as in var. *confusa.* *Sepals* broadly oval, 2—3 mm.

long and 1—2 broad. *Corolla* with the wings of the upper petal blackish-red like the tip of the inner ones, 9—10 mm. long. *Fruit* rounded-obtuse above and narrowed below; when dry, more finely rugose than in var. *confusa*; about 2 mm. long and broad.

Jersey and Cornwall; perhaps introduced from southern Europe with agricultural seeds.

Southern France, Corsica, Italy (incl. Sicily); Algeria.



Map 69. Distribution of *F. bastardi* in the British Islands

(*c*) **F. bastardi** var. **hibernica** Pugsley *Fum. Brit.* 41 (1912).

Icones :—Babington *Eng. Bot. Suppl.* t. 2976, as *F. confusa.*

Exsiccata :—Herb. Pugsley, 129, 136, 143.

Of diffuse and lax habit. *Leaf-segments* relatively broader than in the preceding varieties. *Bracts* more than half as long as the fruiting pedicels. *Corolla* with the wings of the upper petal and the tip of the inner ones blackish-red, and the outer petals apiculate or very acute with attenuate keels, 9—11 mm. long. *Fruit* usually rounded-obtuse above and sometimes narrowed below, nearly 2·5 mm. long and broad.

Cornwall, Gloucestershire, Carnarvonshire, Lancashire, Wigtownshire and Arran; widely spread in Ireland. Not known elsewhere.

*F. bastardi* is locally abundant as a weed of cultivated ground from the Channel Isles, Cornwall and Kent to Orkney; chiefly western in England; very generally distributed in Ireland.

France (incl. Corsica), Spain, Italy (incl. Sardinia and Sicily), Greece, Tunis, Algeria, Madeira.

## 5. FUMARIA MARTINI. Plate 184

**Fumaria martini** Clavaud in *Act. Soc. Linn. Bordeaux* xlii, sér. 5, ii, p. lxix (1888); *F. paradoxa* Pugsley *Fum. Brit.* 31 (1912).

Icones :—*Camb. Brit. Fl.* iii. *Plate 184.* (*a*) Barren branch. (*b*) Fertile branches. (*c*) Part of infructescence. (*d*) Flower (enlarged). (*e*) Lower petal in profile (enlarged). (*f*) Lower petal seen from above (enlarged). (*g*) Sepals (2 enlarged). (*h*) Fresh fruits (enlarged). (*i*) Dry fruits (enlarged). Cornwall (F. H. D.).

Exsiccata :—Bourgeau (*Pl. d'Esp.*), 1863, as *F. bastardi*; Magnier (*Fl. Sel.*), 1075, as *F. martini*; Sennen (*Pl. d'Esp.*), 14, as *F. muralis* var. *paui.*

*Stem* robust, diffuse or climbing. *Leaves* light green; leaf-segments oblong or cuneiform, acute or mucronate. *Racemes* lax, with about 20 flowers, when vigorous much exceeding the short peduncles. *Bracts* linear-oblong, cuspidate. *Pedicels* rather slender, about twice as long as the bracts, commonly arcuate in flower and erect-spreading or divaricate in fruit. *Flowers* from May to October. *Sepals* oval, peltate, usually subentire, acute, 3—5 mm. long and 1·5—2·5 broad. *Corolla* light rose-pink, with the wings of the upper petal and the tip of the inner ones blackish-red, 11—13 mm. long; upper petal rather broad but scarcely dorsally compressed, subacute or apiculate, with wings rarely reaching the apex but equalling or a little exceeding the keel; lower petal subacute with very narrow spreading margins, often deflexed and free. *Fruit* subrotund, little compressed and obscurely keeled, subacute or rounded above, and contracted below to a very obscure neck a little narrower than the tip of the pedicel; when dry, smooth or more rarely rugulose, with fairly large and distinct apical pits; of moderate size or rather large, 2·5—2·75 mm. long and 2·0—2·5 broad.

The long, lax racemes of large pink flowers of this fine fumitory show some resemblance to those of *F. major* (Badarro in *Giorn. Fis.* dec. 2, ix, 72 (1826); Moretti *Bot. Ital.* i, 10 (1826)); with which both British and French specimens have been confused.

Guernsey and near Penryn, Cornwall.

France (including northern France), Spain.

## 6. FUMARIA MURALIS. Plates 185, 186, 187

**Fumaria muralis** Sonder in litt. ex Koch *Syn.* ed. 2, 1017 (1845); Rouy et Foucaud *Fl. France* i, 172 (1893) excl. race *affinis* et race *vagans* p. 174, et race *gussonii* et race *confusa* p. 175; Pugsley in *Journ. Bot.* xl, 132 et 175 (1902); *Fum. Brit.* 16 (1912); *F. media* Hammar *Mon.* 28 (1857) excl. var. *confusa*, non *F. media* Loiseleur.

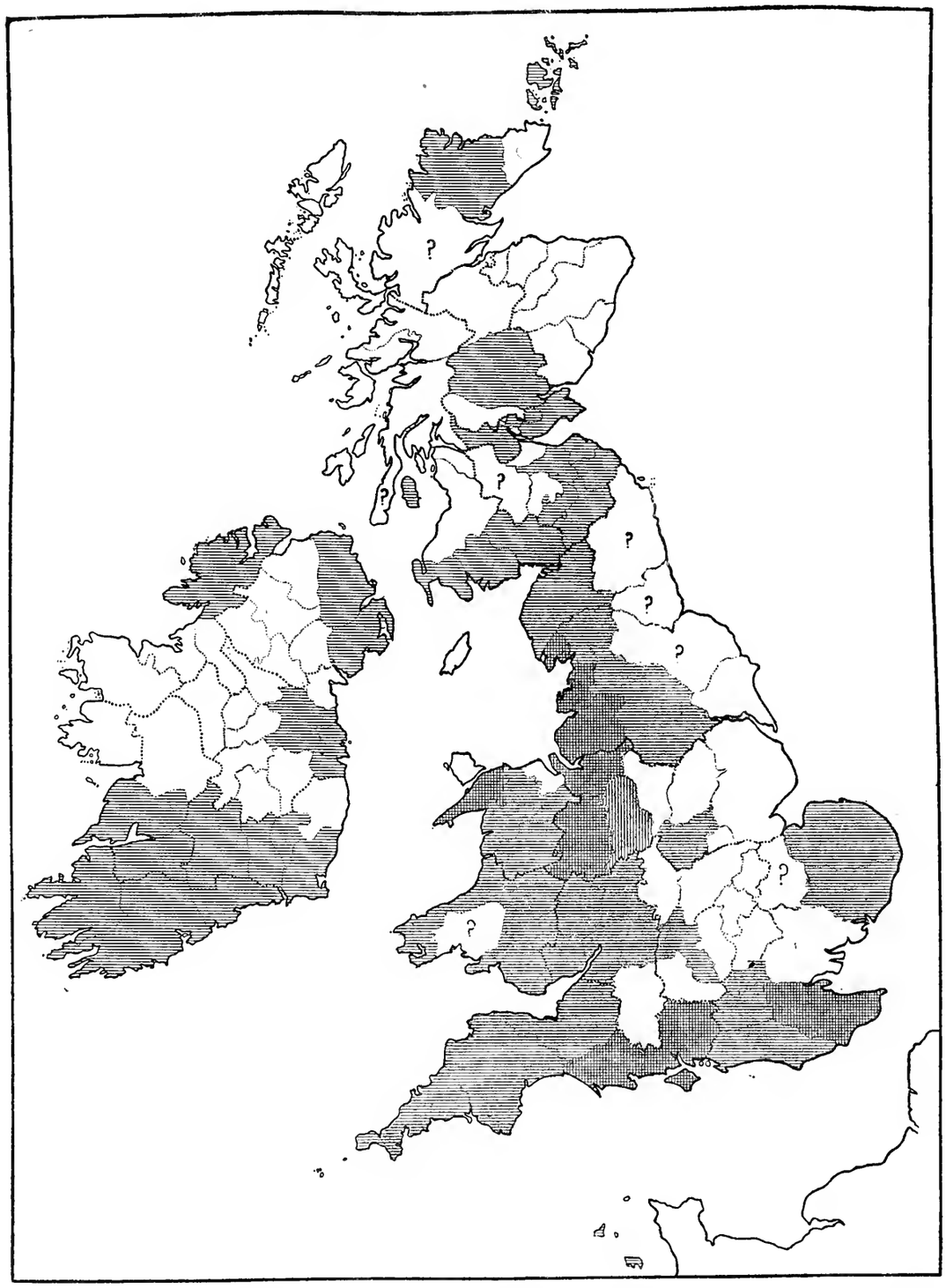
Annual. *Leaf-segments* lanceolate, oblong or cuneiform, acute or mucronate, resembling those of *F. capreolata.* *Racemes* rather lax, few-flowered or rarely many-flowered, equalling or exceeding the peduncles. *Bracts* nearly as long as or only half as long as the pedicels. *Flowers* from May to October. *Sepals* ovate or broadly oval, peltate, dentate or rarely subentire. *Corolla* rose-pink; wings of the upper petal as well as the tip of the inner petals blackish-red; upper petal dorsally compressed, with a spathulate dilation of the wings which is most apparent in the bud stage before the wings have reflexed upwards; lower petal with very narrow and usually erect margins. *Fruit* small or of moderate size; when dry, smooth or faintly rugulose with small and distinct apical pits.

The three subspecies brought together under *F. muralis* are widely different plants in their extreme states; but the subsp. *sonderi* of western Europe and the Atlantic islands and the subsp. *boraei* in this country and France are so polymorphic and present so many intermediate and critical forms that it seems impossible to define them satisfactorily as separate species.

(i) **F. muralis** subsp. **sonderi** Pugsley in Moss *Camb. Brit. Fl.* iii, 179; *F. muralis* Sonder ex Koch *loc. cit.*; Lowe *Fl. Mader.* i, 13 (1868); Haussknecht in *Flora* lvi, 523 (1873); Pugsley *Fum. Brit.* 22 (1912) excl. subsp. *neglecta* p. 24 et subsp. *boraei* p. 25; *F. media* var. *muralis* Hammar *Monogr.* non *F. media* Loiseleur.

*Stem* very slender, often much branched, suberect, diffuse or climbing. *Leaves* light green or glaucescent; segments lanceolate or oblong. *Racemes* usually few-flowered, nearly equalling the

slender peduncles. *Bracts* linear-lanceolate, acuminate. *Fruiting pedicels* about half as long again as the bracts, slender, usually straight and erect-spreading, occasionally flexuous and recurved. *Sepals* ovate, dentate or denticulate about the base and along the lower margin, acute or acuminate, 3—4 mm. long and 1·5—2·5 broad. *Corolla* 9—11 mm. long; upper petal not broad, apiculate or obtuse, with the wings exceeding the keel. *Fruit* subrotund-ovate or subrotund, little compressed laterally,



Map 70. Distribution of *F. muralis* in the British Islands. The subsp. *boraei* occurs in the counties which are shaded lightly; also, probably, in those marked ?; the subsp. *sonderi* in those with intermediate shading; and both in those shaded darkly. The subsp. *neglecta* is endemic in Cornwall

generally subacute or apiculate even when dry, abruptly contracted below to a narrow and almost obsolete neck, smooth when dry, small, 2·0—2·5 mm. long and rather less in breadth.

(i *a*) **F. muralis** subsp. **sonderi** var. **vera** Pugsley in Moss *Camb. Brit. Fl.* iii, 180; *F. muralis* Sonder *loc. cit.*, in sensu stricto; *F. muralis* subsp. *muralis* Pugsley *Fum. Brit.* 22 (1912) excl. vars.

Icones:—*Fl. Dan.* t. 2473, as *F. muralis* (characteristic as regards all except the fruit).

The plate of Syme (*Eng. Bot.* ed. 3, i, t. 74, as *F.* [*capreolata* subsp.] *muralis*) is not satisfactory, and may have been drawn from a slender form of our *F. muralis* subsp. *boraei*.

Exsiccata :—Billot, 2807, as *F. muralis*; Mandon (*Pl. Mader.*), 5, as *F. muralis*; Bourgeau (*Pl. Canar.*), 1173, as *F. officinalis*.

*Peduncles* frequently incurved. *Racemes* with less than 12 flowers. *Corolla* 9—10 mm. long; upper petal apiculate. *Fruit* subrotund-ovate, very small, not more than 2 mm. long including the apiculus, and somewhat less in breadth.

This variety is the true plant of Sonder from Hamburg.

Very rare; Isle of Wight, Staffordshire, Cheshire, Lancashire, Carnarvonshire; in recent years only known for Staffordshire.

(i *b*) **F. muralis** subsp. **sonderi** var. **decipiens** Pugsley in Moss *Camb. Brit. Fl.* iii, 181; *F. muralis* subsp. *muralis* var. *decipiens* Pugsley *Fum. Brit.* 23 (1912).

Exsiccata :—Herb. Pugsley, 171, 178.

Larger in all its parts than var. *vera*. *Peduncles* sometimes incurved. *Racemes* often with 10—15 flowers. *Pedicels* often flexuous or irregularly recurved. *Sepals* rather larger than in var. *vera*. *Corolla* 10—11 mm. long; upper petal apiculate. *Fruit* subrotund-ovate, 2·5 mm. long, including the apiculus.

This is a critical plant, not always readily distinguishable from the slender forms of the subsp. *boraei*.

Rare; Dorset, Hampshire, Kent, and Shropshire.

The subsp. *sonderi* can only be recorded from the above eight counties of England and Wales, and is not certainly known in Scotland or Ireland.

Norway, Germany, western France, Spain, Portugal; Atlantic islands; South Africa; Bermuda; adventitious in Mauritius, Java, and New Zealand.

(ii) **F. muralis** subsp. **neglecta** Pugsley *Fum. Brit.* 24 (1912).

Icones :—*Camb. Brit. Fl.* iii. *Plate 185*. (*a*) Flowering branch. (*b*) Fruiting branch. (*c*) Inflorescence. (*d*) Flower (enlarged). (*e*) Lower petal in profile. (*f*) Sepals (two enlarged). (*g*) Fresh fruits (enlarged). (*h*) Dried fruits (enlarged). Cornwall (F. H. D.).

Exsiccata :—Herb. Pugsley 164.

*Stem* robust, suberect or ascending. *Leaves* light green; leaf-segments oblong or lanceolate. *Racemes* long, with less than 20 flowers, exceeding the straight peduncles. *Bracts* linear-oblong, cuspidate. *Fruiting pedicels* about twice as long as the bracts, slender, straight, suberect. *Sepals* broadly oval, subentire or faintly toothed below, shortly acute, rather persistent, about 3 mm. long and 1·5—2·0 mm. broad. *Corolla* 9—10 mm. long: upper petal not broad, obtuse, wings somewhat exceeding the keel and extending to its apex: spur longer than the sepals. *Fruit* very shortly obovate, nearly truncate, moderately compressed and obscurely keeled; when dry, faintly rugulose; small, slightly over 2 mm. long and broad.

This subspecies is, so far as is at present known, endemic to western Cornwall. It was discovered in 1907 in some quantity near Penryn, growing in the vicinity of *F. martini*. It also occurs in a second locality near Truro. It is placed as a subspecies of *F. muralis* with some hesitation, for while in corolla and fruit it clearly approaches both subsp. *sonderi* and subsp. *boraei*, its long and straight racemes and relatively short and broad bracts recall *F. bastardi*; and its sepals are normally subentire like those of *F. martini*. It is quite possible that it may have been overlooked in other habitats as its relatively small flowers render it inconspicuous; and the fumitories of this series have been very generally confused.

(iii) **F. muralis** subsp. **boraei** Pugsley [in *Journ. Bot.* xl, 178 (1902)] *Fum. Brit.* 25 (1912); *F. boraei* Jordan *Cat. Gren.* 15 (in annot.) (1849) nomen; *Pugillus* 4 (1852); Haussknecht in *Flora* lvi, 520 (1873); *F. bastardi* var. *major* Boreau in Duchartre's *Rev. Bot.* ii, 359 (1846—1847); *F. confusa* mult. auct. angl., non Jordan.

*Stem* robust or slender, considerably branched, suberect, diffuse or climbing to a height of 1—2 m. *Leaves* light green, rarely glaucous; leaf-segments broadly cuneiform, oblong or more rarely lanceolate. *Racemes* with about 12 flowers, nearly equalling the usually straight peduncles. *Bracts* linear-lanceolate, acuminate. *Fruiting pedicels* twice as long as or at least a little longer than the bracts, straight and erect-spreading or more rarely flexuous or recurved. *Sepals* ovate, generally irregularly dentate towards the base, acute, acuminate, 3—5 mm. long and 2—3 broad. *Corolla* 10—12 mm. long; upper petal broad, subacute or apiculate or more rarely obtuse, wings often much exceeding the keel but seldom quite reaching the apex; spur shorter than the sepals; lower petal very rarely with spreading margins, often deflexed and free. *Fruit* usually obovate, rounded-obtuse above, contracted below to an obscure neck; when dry, faintly rugulose or smooth; of moderate size or more rarely small, 2·0—2·5 mm. long and generally nearly as broad.

(iii *a*) **F. muralis** subsp. **boraei** var. **typica** Pugsley in Moss *Camb. Brit. Fl.* iii, 182; *F. muralis* subsp. *boraei* Pugsley *Fum. Brit.* 25 (1912) excl. vars.; *F. boraei* Jordan *loc. cit.*, in sensu stricto; *F. media* var. *typica* Hammar *Mon.* 28 (1857) non *F. media* Loiseleur.

Icones :—Curtis *Fl. Lond.* ii, t. 145, as *F. capreolata*; Smith *Eng. Bot.* t. 943, as *F. capreolata.*

*Camb. Brit. Fl.* iii. *Plate 186.* (*a*) Fertile branch. (*b*) Flower (enlarged). (*c*) Lower petal in profile (enlarged). (*d*) Lower petal from above (enlarged). (*e*) Sepals (two enlarged). (*f*) Fresh fruit (enlarged). (*g*) Dried fruits (enlarged). (*h*) Lower leaf. Jersey (E. W. H.).

Exsiccata :—Billot, 2209, et 2209 bis, as *F. boraei*; Schultz (*H. N.*), 1007, as *F. boraei*; herb. Marshall, 2413, 2414, as *F. boraei.*

*Shoot* robust. *Leaf-segments* generally broadly cuneiform. *Fruiting pedicels* normally straight and erect-spreading. *Sepals* large, 4—5 mm. long and 2·5—3·0 broad. *Corolla* rich rose-pink in colour, often 12 mm. long. *Fruit* obovate, very obtuse but not truncate, with the neck usually narrower than the tip of the pedicel, of moderate size, 2·5 mm. long and 2·0—2·25 broad.

(iii *a*, *β*) subsp. **boraei** var. **typica** forma **rubens** Pugsley in Moss *Camb. Brit. Fl.* iii, 182; *F. muralis* subsp. *boraei* forma *rubens* Pugsley *Fum. Brit.* 26 (1912).

Exsiccata :—Herb. Pugsley, 185.

*Leaves* vinous tinted. *Sepals* rosy red. *Corolla* deep rose-coloured or almost crimson, 12 mm. long; upper petal with wings nearly black, broad, reaching the apex.

This is the commonest variety of the subspecies, occurring throughout both Great Britain and Ireland. In different districts it shows considerable variation; and intermediates occur approaching some of the other varieties. It is especially well marked in the Channel Islands. The forma *rubens* is particularly handsome, and is known from the Channel Isles, Devonshire and Cornwall.

(iii *b*) **F. muralis** subsp. **boraei** var. **ambigua** Pugsley in *Journ. Bot.* xl, 178 and 180 (1902); *Fum. Brit.* 26 (1912).

Exsiccata :—Herb. Pugsley, 192, 199.

*Shoot* robust. *Leaf-segments* narrow, oblong or lanceolate. *Fruiting pedicels* as in var. *typica.* *Sepals* ovate-lanceolate, acuminate, 4—5 mm. long and 2·0—2·5 broad. *Corolla* paler and more narrowly winged than in var. *typica*, rarely exceeding 11 mm. in length. *Fruit* more square than obovate in profile, distinctly laterally compressed, scarcely narrowed below to a base equalling or overlapping the tip of the pedicel, with obscure apical pits, nearly 2·5 mm. long and broad.

This variety simulates *F. bastardi* in the shape of its fruit—a likeness which has certainly contributed to the confusion of the species.

Locally common in northern Devonshire, also in Somerset, Sussex, and probably other English counties, as well as in co. Wexford, Ireland.

(iii *c*) **F. muralis** subsp. **boraei** var. **gracilis** Pugsley *Fum. Brit.* 26 (1912); *F. muralis* auct. angl. part., non Sonder.

Exsiccata :—Herb. Pugsley, 206, 213.

*Shoot* usually slender and climbing. *Leaf-segments* oblong or lanceolate. *Peduncles* incurved and rather slender. *Fruiting pedicels* rarely longer than the bracts, variable in direction, straight and erect-spreading or divaricate, or flexuous and recurved. *Sepals* large, acuminate, 4—5 mm. long and 2—3 broad. *Corolla* paler than in var. *typica*, with the upper petal narrower, 10—11 mm. long. *Fruit* obovate, resembling that of var. *typica.*

This variety has often been mistaken for the subsp. *sonderi* which it much resembles except for its larger, obtuse, and obovate fruits. Its long bracts, large sepals, and frequently recurving pedicels have also caused it to be confused with *F. capreolata.*

Cornwall, Hampshire, Surrey, Pembrokeshire, Cardiganshire.

(iii *d*) **F. muralis** subsp. **boraei** var. **britannica** Pugsley in *Fum. Brit.* 27 (1912); *F. muralis* auct. angl. part., non Sonder.

Icones :—*Camb. Brit. Fl.* iii. *Plate 187.* (*a*) Shoot with fruits and depauperate flowers. (*b*) Flowers (enlarged). Somerset (E. S. M.).

Exsiccata :—Herb. Marshall, 2915, as *F. boraei* var. *serotina*; herb. Pugsley, 220.

*Shoot* lax, slender, diffuse or climbing, leaves often small and glaucescent. *Leaf-segments* rather broad. *Peduncles* slender. *Fruiting pedicels* slender, usually straight and erect-spreading. *Sepals* acute, 3—4 mm. long and 2·0—2·75 broad. *Corolla* often paler than in var. *typica*, rarely exceeding 10 mm. in length. *Fruit* subrotund-obovate, very obtuse, little compressed laterally, when fresh, sometimes subapiculate before maturity, little more than 2 mm. long and nearly as broad.

Like var. *gracilis*, this var. *britannica* approaches the subsp. *sonderi*, from which it may be distinguished by its less slender habit, broader leaf-segments, more deeply cut sepals, and broader upper petal, as well as by its fruit which is not only very obtuse and faintly rugulose but appreciably more obovate and more broadly necked.

Widely distributed from the Channel Isles (where it exists as a distinct form) northwards to Lancashire; co. Cork and co. Clare. Unknown elsewhere.

(iii *e*) **F. muralis** subsp. **boraei** var. **longibracteata** Pugsley in Moss *Camb. Brit. Fl.* iii, 183; *F. muralis* subsp. *boraei* var. *britannica* subvar. *longibracteata* Pugsley *Fum. Brit.* 27 (1912).

Exsiccata:—Herb. Pugsley, 227.

*Shoot* lax and slender, often climbing. *Leaf-segments* rather broad. *Racemes* normally with 5—8 flowers, shorter than the peduncles. *Fruiting pedicels* shorter than the bracts, stout, straight, erect-spreading. *Sepals* acuminate, 3·0—4·5 mm. long and about 2·5 broad. *Corolla* about 10 mm. long. *Fruit* subrotund-obovate as in var. *britannica*.

This variety is notable for its very short and few-flowered racemes, and for its bracts constantly exceeding the short pedicels. It is locally abundant along the coast of North Wales.

The subsp. *boraei* is a beautiful plant when well grown, and is by far the commonest of the large-flowered fumitories in the British Isles. It flourishes in all kinds of cultivated ground and on walls and hedgebanks, and is sometimes so abundant as to colour whole fields with the rosy hue of the flowers.

The subsp. *boraei* extends from the Channel Isles, Cornwall and Kent northward to Orkney; southern, eastern, and northern Ireland.

Southern Scandinavia, France, and Spain; very doubtful for the other countries from which it has been recorded.

*F. muralis* is locally abundant in England (rare in eastern England), Wales, southern Scotland, Perthshire, Sutherlandshire, and Orkney, and Ireland.

Scandinavia, Germany, France, Spain, Portugal; Atlantic islands; South Africa; Bermuda; adventitious in Mauritius, southern India, Java, and New Zealand.

**F. muralis** subsp. **boraei** × **officinalis** Pugsley in Moss *Camb. Brit. Fl.* iii, 183; × *F. painteri*[1] Pugsley *Fum. Brit.* 29 (1912).

Exsiccata:—Herb. Pugsley, 234.

*Shoot* robust, rampant. *Leaf-segments* rather narrow, oblong or lanceolate. *Racemes* lax, with about 20 flowers, exceeding the peduncles. *Bracts* linear-lanceolate, acuminate. *Fruiting pedicels* a little longer than the bracts, usually straight, erect-spreading. *Sepals* ovate-lanceolate, peltate, dentate or laciniate towards the base, acuminate, 3·0—3·5 mm. long and 1·5 broad. *Corolla* pale pink, the tip of the inner petals and the wings of the upper one blackish-red, 10—11 mm. long; upper petal dorsally compressed, obtuse, with a spathulate dilation of the wings; wings reflexed upwards, exceeding the keel and extending to its abruptly terminated apex; lower petal with narrow and spreading margins dilated towards the apex, subspathulate. *Fruit* nearly square in profile, truncate or subemarginate, with a rather short and persistent apiculus; when dry, faintly rugulose, with somewhat broad and shallow apical pits; of moderate size, 2·5 mm. long and broad.

This very interesting fumitory, collected in Shropshire by the late Rev. W. H. Painter, is intermediate in character between *F. muralis* subsp. *boraei* and *F. officinalis*, and is probably a hybrid of the parentage indicated. Unlike other known hybrids of *Fumaria*, however, it produces fruit; and it is possible that on further investigation it may be found to be an established form or even a distinct species. It is unknown elsewhere.

## Subsection ii. *PARVIFLORA*

**Parviflora** Pugsley in Moss *Camb. Brit. Fl.* iii, 183; *Officinales* Hammar *Monogr.* 9 (1857) as a "section"; Rouy et Foucaud *Fl. France* i, 177 (1893); *Angustisectae* Haussknecht in *Flora* lvi, 404 (1873); *Parviflorae* Pugsley *Fumit. Brit.* 45 (1912) as a section.

For characters, see page 171.

### Series of *Parviflora*

Series iv. **Micranthae** (p. 184). *Pedicels* sometimes much thickened upwards, erect-spreading or rarely recurved in fruit. *Sepals* large, usually broader than the corolla and exceeding one-third of its length. *Lower petal* less distinctly spathulate than in the series *Officinales* and *Eu-Parviflorae*. *Fruit* small or of moderate size, subrotund; when dry, granular-rugose or rugulose.

Series v. **Officinales** (p. 185). *Pedicels* relatively little thickened upwards, erect-spreading in fruit. *Sepals* narrower than the corolla and rarely exceeding one-third of its length. *Fruit* of

[1] After the Rev. W. H. Painter (1835—1910).

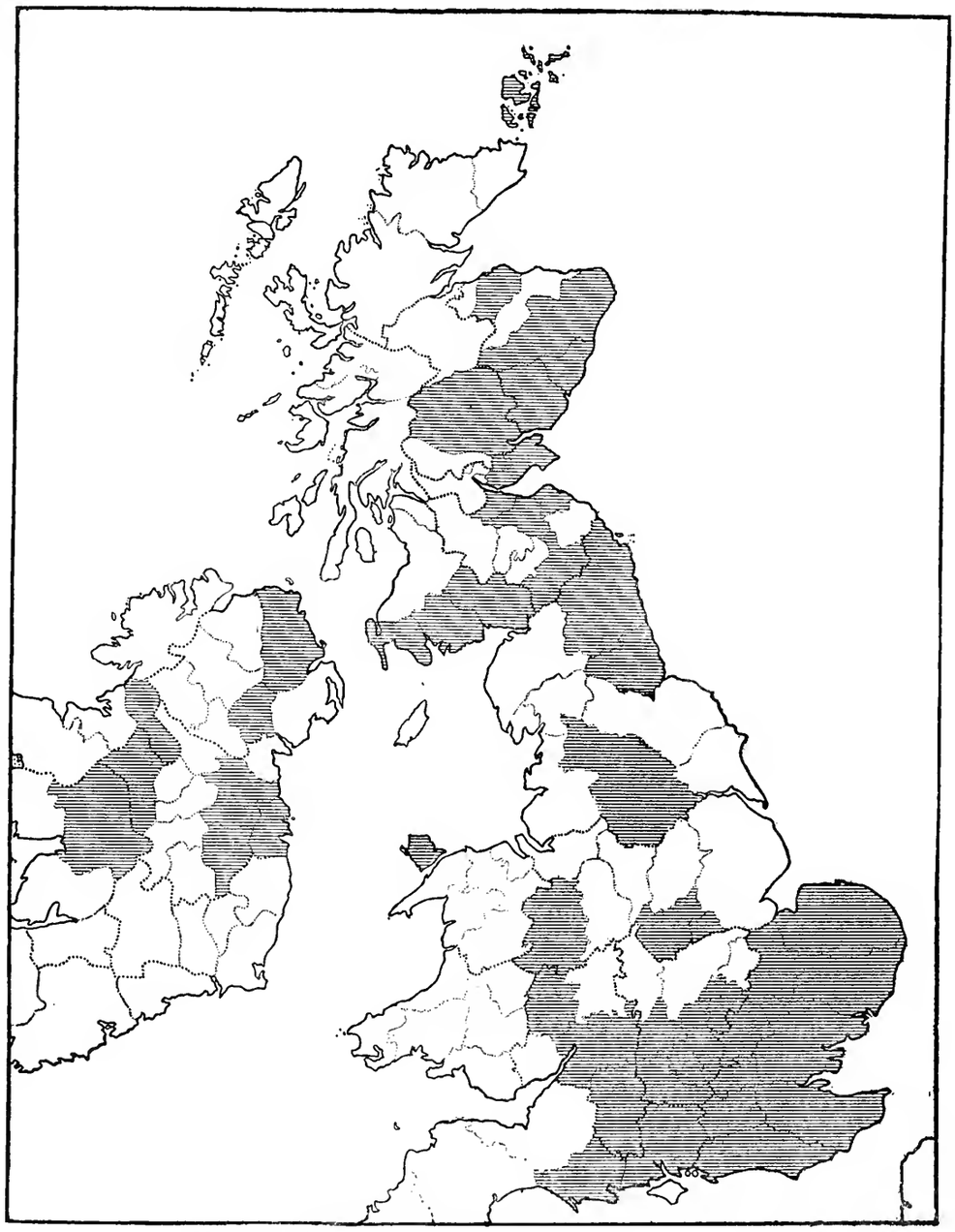
moderate size, truncate or subemarginate, and at least as broad as long; when dry, rugose or rugulose.

Series vi. **Eu-Parviflorae** (p. 187). *Pedicels* stout or slender, erect-spreading in fruit. *Sepals* very small, much narrower than the corolla and generally less than one-fourth of its length. *Fruit* usually small, subrotund or subrotund-ovate; when dry, granular-rugose or rugulose.

Series iv. *MICRANTHAE*

**Micranthae** Pugsley in Moss *Camb. Brit. Fl.* iii, 184; *Latisepalae* Haussknecht in *Flora* 493 (1873); Pugsley *Fum. Brit.* 54 (1912) as a subsection.

For characters, see page 183. Only British species: *F. micrantha.*



Map 71. Distribution of *F. micrantha* in the British Islands

## 7. FUMARIA MICRANTHA. Plate 188

*F. tenuifolia* Gerard *Herball* 928 (1597).

**Fumaria micrantha** Lagasca *Gen. Spec. Pl. Nov.* 21 (1816); Hammar *Mon.* 21, t. 2 (1857); Syme *Eng. Bot.* i, 109 (1863); Rouy et Foucaud *Fl. France* i, 179 (1893); Pugsley *Fum. Brit.* 54 (1912); *F. densiflora* Grenier et Gordon *Fl. France* 1, 68 (1847); Haussknecht in *Flora* lvi, 507 (1873); ? DC. *Cat. Hort. Monsp.* 113 (1813) partim; *F. calycina* Babington in *Trans. Bot. Soc. Edinb.* i, 34 (1844).

Icones :—Babington in *Eng. Bot. Suppl.* t. 2876.

*Camb. Brit. Fl.* iii. *Plate 188.* (*a*) Fertile branch. (*b*) Inflorescence. (*c*) Flower (enlarged). (*d*) Lower petal in profile (enlarged). (*e*) Lower petal seen from above (enlarged). (*f*) Sepals (three enlarged). (*g*) Fresh fruit (enlarged). (*h*) Dried fruits (enlarged). Hertfordshire (E. W. H.).

Exsiccata :—Heldreich (*Herb. Graec.*), 1205; Porta et Rigo, 238, as *F. densiflora*; Schultz (*H. N.*), vii, 211 bis.

Annual. *Stem* robust, usually elongate, suberect, diffuse or rarely climbing. *Leaves* much divided, often 4-pinnatisect, slightly glaucous; lobes of the leaflets linear or linear-oblong, acute or mucronate, generally channelled. *Racemes* very dense when in flower, lengthening and becoming lax in fruit, with 20—30 flowers, much exceeding the stout and short peduncles. *Bracts* linear-oblong, cuspidate, tinted with pink. *Fruiting pedicels* normally shorter than the bracts, much dilated above, straight, and erect-spreading. *Flowers* May to September. *Sepals* orbicular or broadly ovate, peltate or subcordate, either subentire or more or less laciniate about the base, mucronate or acute, 2·5—3·5 mm. long and 2—3 broad. *Corolla* pink, with the wings of the upper petal and the tip of the inner ones dark red, 6—7 mm. long; upper petal rather narrow, obtuse or subacute, with erect-spreading wings rarely much exceeding the keel though usually reaching its apex; spur ascending, relatively large and rounded; lower petal subspathulate with spreading margins. *Fruit* subglobose, rounded-obtuse above but distinctly keeled; when fresh, with a minute apiculus and an indistinct neck a little narrower than the tip of the pedicel; when dry, granular-rugose with obscure and shallow apical pits; of moderate size, 2·0—2·5 mm. long and broad.

(*β*) subvar. **dubia** Pugsley in Moss *Camb. Brit. Fl.* iii, 185; *F. micrantha* forma *dubia* Pugsley *Fum. Brit.* 58 (1912).

Icones :—*Fl. Dan.* t. 2472, as *F. micrantha.*

Exsiccata :—Billot, 709, as *F. densiflora*; Ridley and Fawcett, anno 1883, in Herb. Mus. Brit.

*Sepals* relatively narrow, ovate, more or less laciniate towards the base, acute, 2·0—2·5 mm. long and 1·0—1·5 broad. *Corolla* not exceeding 6 mm. in length.

Dorset, Wiltshire, Sussex.

This species was first described and figured by Gerard (*loc. cit.*) who collected his specimens between Charlton and Greenwich in Kent.

Cornfields and arable land generally; from Dorset and Kent northwards to Orkney; characteristic of the Chalk districts of southern and eastern England and of the Old Red Sandstone districts of the Welsh border and of the east and north of Scotland; rare in Ireland: absent in the Channel Islands.

Germany, Belgium, France, southern Europe; northern Africa; south-western Asia.

Series v. *OFFICINALES*

**Officinales** Haussknecht in *Flora* lvi, 404 (1873); Pugsley *Fum. Brit.* 45 (1912) as a subsection; Hammar *Monogr.* 9 (1857) as a "section," partim.

For characters, see page 183. Only British species :—*F. officinalis.*

## 8. FUMARIA OFFICINALIS. Common Fumitory. Plate 189

*F. purpurea* Gerard *Herball* 927 (1597); *F. vulgaris* Parkinson *Theatr. Bot.* 287 (1640); Ray *Synopsis* ed. 3, 204 (1724).

**Fumaria officinalis** L. *Sp. Pl.* 700 (1753); Smith *Eng. Bot.* no. 589 (1799); *Fl. Brit.* 750 (1800); Hammar *Mon.* 9, t. 1 (1857); Syme *Eng. Bot.* i, 110 (1863); Haussknecht in *Flora* lvi, 404 (1873); Rouy et Foucaud *Fl. France* i, 177 (1893); Pugsley *Fum. Brit.* 45 (1912).

Annual. *Stem* more or less robust, often much branched, suberect, diffuse or sometimes climbing. *Leaves* glaucescent; leaflets cut into flat, lanceolate, or linear-oblong, acute or slightly mucronate lobes. *Racemes* dense when young, soon lengthening, often many-flowered, exceeding the short, stout peduncles. *Bracts* linear-lanceolate, acuminate. *Fruiting pedicels* straight, erect-spreading, longer than the bracts. *Flowers* May to October. *Sepals* ovate or ovate-lanceolate, scarcely peltate, dentate or laciniate below, acuminate or cuspidate, 2·0—3·5 mm. long and 1·0—1·5 mm. broad. *Corolla* purplish-pink, with the wings of the upper petal and the tip of the inner petals blackish-red, 6—8 (rarely 9) mm. long; upper petal broad, dorsally compressed, obtuse or apiculate, with a spathulate dilation of the erect-spreading wings, generally exceeding the keel and extending to its apex; lower petal distinctly spathulate, with spreading margins. *Fruit* truncate or subemarginate, sometimes with a small apiculus, obscurely keeled, broadest

above or about the middle, narrowed below to an almost obsolete neck nearly equalling the tip of the pedicel; when dry, rugose with shallow and very broad apical pits: of moderate size, 2·0—2·5 mm. long and at least as broad.

(*a*) **F. officinalis** var. **major** Koch in Sturm *Deutschl. Fl.* i, 62, t. 14, no. 14 (1833); *F. officinalis* Rouy et Foucaud *Fl. France* i, 177 (1893) excl. vars.; Pugsley *Fum. Brit.* 51 (1912) excl. vars.

Icones:—*Eng. Bot.* t. 589; Curtis *Fl. Lond.* i, t. 147; Reichenbach *Icon.* (*Papav.*) t. 3, fig. 4454, as *F. officinalis*.

*Camb. Brit. Fl.* iii. *Plate 189.* (*a*) Fertile branch. (*b*) Infructescence. (*c*) Flower (enlarged). (*d*) Upper petal seen from above (enlarged). (*e*) Lower petal seen from above (enlarged). (*f*) Sepals (two enlarged). (*g*) Fresh fruits (enlarged). (*h*) Dried fruits (enlarged). Huntingdonshire (E. W. H.).

Exsiccata:—*Exsicc. Austr.-Hung.*, 2901, as *F. officinalis*.

*Racemes* usually with 20—30 flowers. *Bracts* about two-thirds as long as the moderately thick fruiting pedicels. *Sepals* generally 2·5—3·5 mm. long. *Corolla* normally deeply coloured, with wings of the upper petal much exceeding the keel (paler and narrower in shade-forms), 7—9 mm. long. *Fruit* broadest above the middle, shortly obcordate or nearly obreniform, more frequently subemarginate than truncate, 2—2·5 mm. long and 2·5—3 broad.

(*β*) var. **major** subvar. **scandens** comb. nov.; *F. officinalis* forma *scandens* Pugsley *Fumit. Brit.* 51 (1912).

Icones:—Reichenbach *Icon.* (*Papav.*), t. 3, fig. 4454, as *F. officinalis* var. *scandens*.

Exsiccata:—De Heldreich (*Hb. Graec.*), 1204, as *F. officinalis* var. *media*.

*Shoot* very robust, often climbing, scarcely glaucous. *Laminae* cut into larger, linear-oblong segments.

This subvariety is very near to and perhaps identical with *F. media* Loiseleur (*Notice* 101 (1810)), and has been found in a few counties in the south of England.

*F. officinalis* var. *major* is the commonest fumitory of the British Isles and of many parts of the mainland of Europe. It is exceedingly variable. The following forms of it have been distinguished by Haussknecht (*op. cit.*):—(α) "floribunda[1]": this is erect and glaucous: its leaves have narrow segments: its corollas are deeply coloured: it blooms early in open fields. (β) "agrestis": this is a spreading, glaucescent plant, with broader leaf-segments and laxer racemes of duller purplish flowers, and is characteristic of summer root-crops. (γ) "umbrosa": this is of lax, diffuse or climbing habit, with broad, light green leaf-segments, and smaller and quite pale flowers; and generally grows in shade: this shade-form is scarcely distinguishable from that of the other varieties of the species.

(*b*) **F. officinalis** var. **elegans** Pugsley *Fum. Brit.* 52 (1912).

Icones:—Reichenbach *Icon.* (*Papav.*), t. 2, fig. 4453, as *F. media*.

Exsiccata:—Billot, 214, as *F. officinalis*; Fiori et Béguinot, ii, 1050, as *F. officinalis*; herb. Pugsley, 241.

*Shoot* usually rampant, glaucous. *Leaves* ample, cut into narrowly lanceolate segments. *Racemes* commonly with 30—40 flowers. *Pedicels* slender, usually about twice as long as the bracts, sometimes recurved in flower. *Sepals* often whitish, 2—3 mm. long. *Corolla* normally pale purplish-pink, rarely deeply coloured, about 7 mm. long; outer petals more narrowly winged than in var. *major*. *Fruit* rather small, shortly obcordate, less laterally compressed and more finely rugose than in var. *major*, about 2 mm. long and 2·5 broad.

This is the most beautiful of the British forms of *F. officinalis*, and was formerly often confused with *F. muralis* and *F. bastardi*. The characters of the variety appear to be fairly uniform.

Chalk districts south of the river Thames.

Widely distributed in Western Europe.

(*c*) **F. officinalis** var. **minor** Koch in Sturm *Deutschl. Fl.* i, 62, t. 14, no. 14 (1833); Hammar *Monogr.* 10 (1857); Haussknecht in *Flora* lvi, 419 (1873); Pugsley *Fum. Brit.* 52 (1912).

Exsiccata:—Orphanides (*Fl. Graec.*) 519, as *F. officinalis* var. *laxiflora*; herb. Marshall, 2551; herb. Pugsley, 262.

*Shoot* slender, diffuse, much branched, glaucous. *Leaves* frequently with broad and obtuse segments. *Racemes* rather lax, with 10—20 flowers. *Sepals* sometimes only acute, about 2 mm. long. *Corolla* often rather pale, 6—7 mm. long. *Fruit* usually subemarginate or obreniform as in var. *major*, 2·0—2·5 mm. long and 2·5—3·0 broad.

This is an inconspicuous variety, characterised mainly by its relatively short racemes of small flowers with small sepals.

Chalk districts of southern England, and doubtless elsewhere.

Widely distributed on the European mainland.

[1] Every fumitory has its "floribunda," "agrestis," and "umbrosa" forms; and I do not adopt these as formal names.

(*d*) **F. officinalis** var. **wirtgeni** Haussknecht in *Flora* lvi, 409 (1873); Pugsley *Fum. Brit.* 52 (1912); *F. wirtgeni* Koch *Syn.* ed. 2, 1018 (1845).

Exsiccata :—Dörfler, 4601, as *F. wirtgeni*; herb. Pugsley, 248, 255.

*Shoot* variable but usually slender. *Racemes* rather lax, 10—20-flowered. *Fruiting pedicels* about as long as the bracts or a little longer, generally shorter and thicker than in the preceding varieties. *Sepals* often acute rather than acuminate, whitish, about 2 mm. long and 1 broad. *Corolla* not deeply coloured, about 7 mm. long; upper petal emarginate and lower one truncate-spathulate owing to the development of the broad wings about the apex. *Fruit* rounded—truncate above, frequently with a small persistent apiculus, broadest about the middle, narrowed below to a less obscure neck than in the preceding varieties, 2·0—2·5 mm. long and equally broad.

This resembles var. *minor* in its short racemes and rather small flowers; but it is frequently rampant in habit. It also has narrower leaf-segments, conspicuously broadly winged corollas, and differently shaped roundish fruits. The combination of these features has sometimes caused it to be mistaken for *F. vaillanti*.

Jersey; southern England; and co. Meath, in Ireland.

Germany, France, Austria.

A weed of gardens and arable land, often very abundant; throughout almost the whole of the British Islands, northwards to Orkney, though rather local or rare in parts of Ireland.

Throughout Europe except northern Scandinavia and northern Russia; Asia Minor; northern Africa and the Canary Islands; adventitious in America.

*F. muralis* subsp. *boraei* × *officinalis* (see page 183).

***F. officinalis* × *parviflora*** Pugsley *Fum. Brit.* 50 (1912).

Exsiccata :—Herb. Pugsley, 276.

*Shoot* extremely luxuriant. *Stems* slender, excessively branched, interlacing. *Leaves* resembling those of *F. officinalis* in form but very much dwarfer and with the segments frequently obtuse. *Racemes* with 6—20 flowers, exceeding the short peduncles. *Bracts* linear-oblong, cuspidate. *Pedicels* fully twice as long as the bracts, suberect. *Sepals* ovate-lanceolate, obscurely dentate, acuminate, 1·5—2·0 mm. long and 0·75 broad. *Corolla* coloured nearly as in *F. officinalis* but paler, 6 mm. long; wings of the upper petal narrow and falling short of the keel; lower petal subspathulate with narrow, obscurely spreading margins. *Fruit* quite abortive.

This putative hybrid was collected at Mickleham, Surrey, in 1910, growing in company with the reputed parents. It occurred as an isolated plant, of enormous size, but entirely barren. It is noteworthy that its bracts are shorter and its outer petals much more narrowly winged than those of either *F. officinalis* or *F. parviflora*.

A putative hybrid of *F. officinalis* var. *wirtgeni* and *F. vaillanti* var. *chavini* (× *F. alberti* Rouy et Foucaud *op. cit.* 178) is recorded for France.

### Series vi. *Eu-Parviflorae*

**Eu-Parviflorae** Pugsley in Moss *Camb. Brit. Fl.* iii, 187; *Parviflorae* Haussknecht in *Flora* lvi, 441 (1873); *Microsepalae* Pugsley *Fumit. Brit.* 59 (1912) as a subsection.

For characters, see page 184.

#### British species of *Eu-Parviflorae*

9. **F. vaillanti** (see below). *Leaf-segments* flat. *Racemes* shortly peduncled. *Bracts* shorter than the fruiting pedicels. *Corolla* pink. *Fruit* obscurely keeled, rounded-obtuse.

10. **F. parviflora** (p. 189). *Leaf-segments* normally channelled. *Racemes* subsessile. *Bracts* equalling or exceeding the fruiting pedicels. *Corolla* white, sometimes flushed with pink. *Fruit* distinctly keeled, mucronulate or shortly beaked.

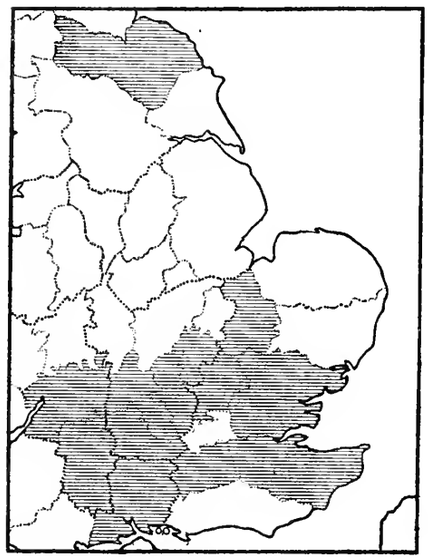
## 9. FUMARIA VAILLANTI. Plate 190

*F. lobis longioribus et angustioribus sparsis* Vaillant *Bot. Paris* 56, t. 10, fig. 6 (1727).

**Fumaria vaillanti** Loiseleur in Desvaux *Journ. Bot.* ii, 358 (1809); Hammar *Mon.* 14, t. 1 (1857); Haussknecht in *Flora* lvi, 441 (1873); Rouy et Foucaud *Fl. France* i, 180 (1893); Pugsley *Fum. Brit.* 66 (1912); *F. tenuisecta* subsp. *vaillanti* Syme *Eng. Bot.* i, 113 (1863).

*Stem* suberect, rarely if ever climbing. *Leaves* usually glaucous; leaflets with flat, linear-oblong or linear, acute segments. *Racemes* usually with 6—16 flowers, exceeding the short peduncles.

*Bracts* linear-lanceolate, acuminate. *Fruiting pedicels* about a third longer than the bracts, normally straight, somewhat dilated above, suberect or erect-spreading. *Flowers* June to September. *Sepals* lanceolate, laciniate-serrate, acuminate, frequently persistent on the young fruit, minute, about 1 mm. long and 0·3—0·5 broad. *Corolla* pink, 5—6 mm. long; tip of the inner petals dark red; wings of the upper petal often obscurely similarly tinted; upper petal dorsally compressed, with a thick green keel and broad erect-spreading wings almost reaching its apex, much developed above, giving an emarginate but apiculate outline; lower petal abruptly truncate-spathulate, margins spreading. *Fruit* subrotund, obscurely keeled, sometimes apiculate when young, when mature almost equally narrowed above and below to a rounded-obtuse apex and a very obscure neck about as broad as the tip of the pedicel; when dry, granular-rugose with small and shallow apical pits; rather small, about 2 mm. long and broad.



Map 72. Distribution of *F. vaillanti* in England

(*a*) **F. vaillanti** var. **sparsifolia** Pugsley in Moss *Camb. Brit. Fl.* iii, 188; *F. vaillanti* Pugsley *Fum. Brit.* 69 (1912) excl. var.

Icones:—Reichenbach *op. cit.*, fig. 4452, as *F. vaillanti*; Sturm *Deutschlands Flora* i, 62, 15, as *F. vaillanti* (good, except for the fruits which are unusually apiculate).

*Camb. Brit. Fl.* iii. *Plate 190.* (*a*) Fertile branch. (*b*) Inflorescence. (*c*) Flower (enlarged). (*d*) Upper petal seen from above (enlarged). (*e*) Lower petal seen from above (enlarged). (*f*) Sepals (3 enlarged). (*g*) Fresh fruits (enlarged). (*h*) Dried fruits (enlarged). Surrey (H. W. P.).

Exsiccata:—Billot, 215, 215 bis, as *F. vaillanti*; Schultz (*H. N.*), v, 414, as *F. vaillanti*; *Fl. Exsicc. Carn.*, 2871, as *F. vaillanti.*

*Shoot* rather dwarf and normally slender, sometimes very much branched. *Leaves* usually bipinnatisect, petiolules long, leaflets relatively few and distant. *Racemes* normally with 6—12 flowers, rather lax. *Fruiting pedicels* usually short and erect-spreading. *Corolla* rather dull or purplish-pink, generally with dark wings to the upper petal.

This variety is that form of the species originally described and figured by Vaillant (*loc. cit.*). It is the common form of the species in this country.

(*b*) **F. vaillanti** var. **chavini** Rouy et Foucaud *Fl. France* i, 181 (1893); Pugsley *op. cit.* 70 (1912); *F. chavini* Reuter *Cat. Pl. Vasc. Genève* éd. 2, 10 (1861); *F. vaillanti* Babington in *Eng. Bot. Suppl.* no. 2877 (1844) partim.

Icones:—Babington in *Eng. Bot. Suppl.* t. 2877 (right-hand figure with the darker flowers), as *F. vaillanti.*

Exsiccata:—Billot, 3508, as *F. chavini.*

*Shoot* more robust, less branched, and less glaucous than in var. *sparsifolia*. *Leaves* bipinnatisect or more often tripinnatisect; leaflets closer together and more numerous. *Racemes* with 10—16 flowers, often rather dense. *Fruiting pedicels* longer, suberect, and frequently flexuous. *Corolla* generally light pink, with dark tips to the inner petals alone. *Fruit* slightly larger and more coarsely rugose than in var. *sparsifolia*.

The occurrence of this plant in England was first detected by Haussknecht (*op. cit.*) who identified it from Babington's Cambridge specimens in Sonder's herbarium. Like the majority of continental examples, the British form does not show the finely developed corollas which characterise the original specimens of Reuter's *F. chavini* from Swiss Alpine and sub-Alpine districts.

Northern Essex and southern Cambridgeshire.

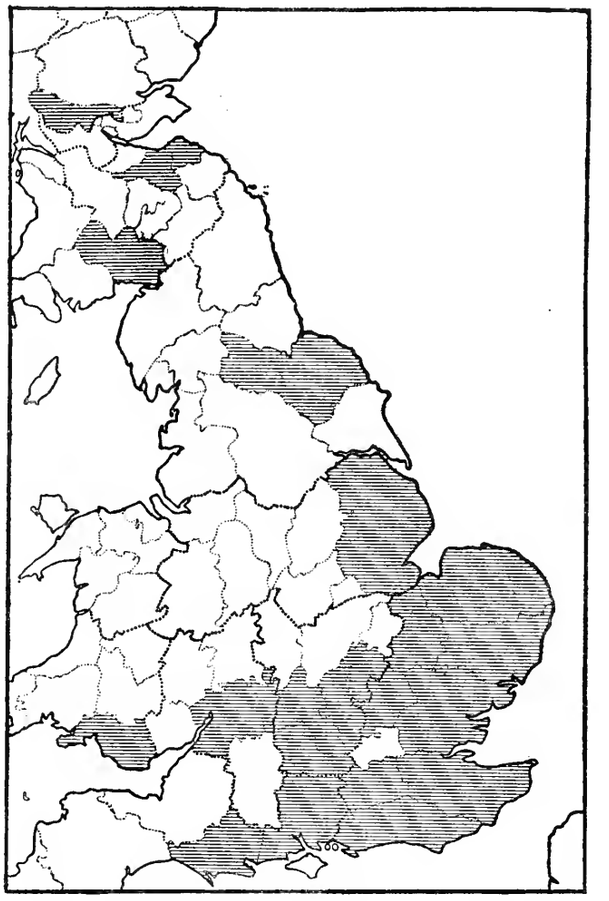
Arable land on calcareous soils, rarely seen in abundance; on the Chalk of south-eastern England, and in Gloucestershire, North Riding of Yorkshire, and Linlithgowshire; not known in Ireland, Wales, or the Channel Islands.

Throughout Europe except northern Scandinavia and northern Russia; Asia Minor to Turkestan. Doubtful for northern Africa.

## 10. FUMARIA PARVIFLORA. Plate 191

**Fumaria parviflora** Lamarck *Encycl. Méthod.* ii, 567 (1786)[1]; Hammar *Mon.* 16, t. 2 (1857); Haussknecht in *Flora* lvi, 456 (1873); Rouy et Foucaud *Fl. France* i, 181 (1893); Pugsley *Fum. Brit.* 60 (1912); *F. tenuisecta* subsp. *parviflora* Syme *Eng. Bot.* i, 114 (1863).

Annual. *Shoot* glaucous. *Stem* generally robust, suberect, diffuse or occasionally climbing. *Leaves* mostly tripinnatisect; leaflets cut into linear and generally acute lobes; lobes normally channelled but flattened and elongate in shade. *Racemes* dense when young, becoming lax in fruit, less than 20-flowered, subsessile or very rarely shortly peduncled. *Bracts* broad, linear-oblong, cuspidate, often serrate above. *Pedicels* about as long as or sometimes shorter than the bracts, thickened, straight and suberect in fruit. *Flowers* May to September. *Sepals* minute, incise-dentate or laciniate, acute, about 1·0—1·5 mm. long and 0·65—0·75 mm. broad. *Corolla* white or flushed with pink, the tip of the inner petals blackish-red and usually with a contiguous external dark blotch at the base of each wing of the upper one, 5—6 mm. long; upper petal broad and much dorsally compressed with a flattened green keel, truncate with spreading (rarely erect-spreading) or occasionally deflexed wings reaching the apex; lower petal ovate-spathulate with spreading margins. *Fruit* subrotund or subrotund-ovate, with little lateral compression but a distinct keel, mucronulate or shortly beaked; neck obscure, as broad as the tip of the thickened pedicel; when dry, granular-rugose, with obscure and shallow apical pits; rather small, 2·0—2·5 mm. long and about 2 mm. broad.



Map 73. Distribution of *F. parviflora* in Great Britain

(*a*) **F. parviflora** var. **leucantha** comb. nov.; *F. parviflora* subsp. *parviflora* var. *leucantha* Clavaud in *Act. Soc. Linn. Bordeaux* xxxv (sér. 4, v), 276 (1881); *F. parviflora* Pugsley *Fum. Brit.* 63 (1912) excl. vars.

Icones:—Reichenbach *Icon.* (*Papav.*) t. 1, fig. 4451, as *F. parviflora*; Sturm *Deutschl. Flora* i, 62, 16, as *F. parviflora.*

Exsiccata:—Fiori et Béguinot (*Fl. Ital. Exsicc.*) ii, 1051, as *F. parviflora*; Heldreich (*Herb. Graec.*), 1206, as *F. parviflora* f. *umbrosa.*

*Shoot* robust, rather lax, generally diffuse or climbing, more or less glaucous. *Sepals* broadly ovate or sometimes nearly orbicular, 1 mm. long and 0·65—0·75 broad. *Corolla* generally white, only occasionally tinted with pink. *Fruit* subrotund, rounded-obtuse above with the keel drawn into a short mucronulus, little more than 2 mm. long and equally broad.

This variety seems to be constant, and not a *forma* dependent on environment. Presumably it is the plant originally described by Lamarck (*loc. cit.*).

Not common; from Dorset to Edinburgh.

Widely spread on the continent of Europe.

(*b*) **F. parviflora** var. **acuminata** comb. nov.; *F. parviflora* subsp. *parviflora* var. *acuminata* Clavaud *op. cit.*, p. 277; Pugsley *op. cit.* 64 (1912).

Icones:—Smith *Eng. Bot.* t. 590, as *F. parviflora* (not characteristic).

Exsiccata:—Bourgeau (*Pl. d'Esp.*), 22, as *F. parviflora*; Schultz (*H. N.*) v, 415 bis, as *F. parviflora.*

*Shoot* dwarf, compact, usually suberect, intensely glaucous. *Leaves* with fine, sometimes sub-capillary segments. *Sepals* as in var. *leucantha.* *Corolla* generally suffused with pink; upper petal

[1] For dates of this *Encycl.* see *Journ. Bot.* xliv, 319 (1906).

broadly winged. *Fruit* subrotund-ovate, ogivale or subacute, with usually a mucronulus and nearly obsolete apical pits; about 2·25—2·5 mm. long and 2 mm. broad.

This variety was the first form of the species to be described in this country.

South-eastern England.

Germany, France, Spain.

(*c*) **F. parviflora** var. **symii**[1] Pugsley *Fum. Brit.* 65 (1912); *F. vaillanti* Babington in *Trans. Bot. Soc. Edinb.* i, 36 (1844); in *Eng. Bot. Suppl.* no. 2877 (1844) partim, non Loiseleur.

Icones:—Babington in *Eng. Bot. Suppl.* t. 2877 (white-flowered branch only), as *F. vaillanti.*

*Camb. Brit. Fl.* iii. *Plate 191.* (*a*) Fertile branch. (*b*) Infructescence. (*c*) Flower (enlarged). (*d*) Upper petal seen from above (enlarged). (*e*) Lower petal seen in profile (enlarged). (*f*) Lower petal seen from above (enlarged). (*g*) Sepals (4 enlarged). (*h*) Fresh fruits (enlarged). (*i*) Dried fruits (enlarged). Cambridgeshire (A. H.).

Exsiccata:—Herb. Pugsley, 269.

*Shoot* robust, somewhat diffuse, very glaucous. *Leaves* with usually short, thick, and sometimes divaricate segments. *Sepals* oval or rhomboidal, dentate chiefly about the middle, about 1·5 mm. long and 0·75 broad. *Corolla* rarely much tinted with pink; wings of the upper petal often narrow and sometimes deflexed. *Fruit* about 2 mm. long and equally broad, subrotund, subapiculate when young, at maturity obtuse with keel drawn into a very short, blunt, and notched beak.

This var. *symii* was first correctly included with *F. parviflora* by Syme in *Eng. Bot.* ed. 3, t. 78, where the figure of Babington's white-flowered "*F. vaillanti*" (*E. B. S.* t. 2877) is transferred to the *E. B.* (ed. 1) plate (t. 590) of this species.

Very local; Cambridgeshire (frequent), Haddingtonshire. Not known elsewhere.

Arable land on strongly calcareous soils (especially where the chalk comes to the surface), chiefly south-east of a line connecting Dorset and Yorkshire, but also in Haddingtonshire and Edinburgh. Not certainly known in Ireland or the Channel Islands.

Throughout Europe except northern Scandinavia and Russia, but rare or doubtful in central Europe; Asia Minor to India; northern Africa, the Canaries; adventitious in Mexico.

***F. officinalis* × *parviflora*** (see page 187).

[1] After J. T. I. Boswell (*né* Syme, afterwards Boswell-Syme) (1822—1888), author of *English Botany*, ed. 3 (1863—1872).

# INDEX TO VOLUME III

Many of the pre-Linnaean synonyms are abbreviated.

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